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EXCESSIVE UTERINE BLEEDING OF FUNCTIONAL ORIGIN*

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FUNCTIONAL uterine bleeding is excessive bleeding due to a disturbance in the hormonal mechanism that controls normal menstruation. Excluded from this category are such organic and constitutional conditions as uterine and ovarian tumors, abortion and ectopic pregnancy, salpingitis, endometritis, hydatidiform mole and chorionepithelioma, and certain blood dyscrasias in which uterine bleeding is a prominent symptom. The disorder known as follicle cytolysis of the ovary due to repeated failure of ovulation is, however, included in the functional group.

Since menstruation is by nature an endocrine phenomenon, it is to be expected that functional menstrual disorders (of which bleeding is one) are more likely to occur at those times in a woman's life when her endocrine system suffers the greatest stress and strain, namely: at puberty, after pregnancy, and in the preclimacteric period. They may, however, develop at any time during the childbearing age.

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The various clinical types of functional uterine bleeding may be described as follows:

1. *Puberty Bleeding* may begin with the very first period or may follow one or more apparently normal periods. Occasionally, menstrual irregularities of tempo, rhythm, and intensity may precede the abnormal flow. The bleeding is more or less periodic and the interval between periods is short and often attended by a brownish vaginal discharge. In some cases, however, the bleeding is nearly constant, lasting for weeks or months or even years. In the latter instances, the flow is not always profuse, there being periods of spotting and staining. Dysmenorrhea is usually absent; if present it is rarely severe.

The patients are usually thin. Hair is of normal distribution and not excessive in amount. Except for varying degrees of anemia due to blood loss, the general health is good. In some cases, the anemia may be very profound, the hemoglobin dropping as low as 25 per cent. In our experience, the follicular hormone content of the urine is usually low and occasionally no hormone is found in a twenty-four-hour specimen. We have never found it to exceed the normal 10 to 20 rat units per liter. Follicle-stimulating hormone is found in some instances, though not with any degree of constancy. Despite the diminished follicular hormone excretion, the secondary sex characteristics are fairly well developed. In some cases, however, uterine hypoplasia of variable degree has been found.

2. *Maturity Bleeding*.—In the majority of instances, the onset follows a pregnancy, whether full term, a miscarriage, or an ectopic. The previous menstrual history is not always normal; amenorrhea and oligomenorrhea are frequent. Dysmenorrhea is usually absent and rarely a prominent feature.

The patients may or may not be stout. Sometimes the obesity is of the so-called "endocrine" type of which there are three varieties:

- a. Trunk adiposity (extremities relatively thin. This is the most common form).
- b. Lower girdle adiposity (obesity confined to hips and lower extremities) and
- c. Upper girdle adiposity (obesity limited to shoulders, breasts and upper extremities. This is the least common form).

These endocrine types of obesity are often associated with varying degrees of hypertrichosis.

The secondary sex characteristics are usually well developed. The uterus is often slightly enlarged and softened, resembling an early pregnancy. In some instances, however, there is hypoplasia of the genital tract.

The anemia that may accompany maturity bleeding is rarely as severe as that of puberty bleeding. The follicular hormone content of the urine is exceedingly variable with a tendency toward subnormal values. Occasionally, follicle-stimulating hormone is found in the urine.

3. *Preclimacteric Bleeding*.—A similar type of functional bleeding very often occurs in women approaching the menopause and may be accompanied by the characteristic vasomotor symptoms of this period. The clinical and laboratory findings are comparable to those found in cases of maturity bleeding.

4. *Ovulation Bleeding*.—In some women, whose periods are otherwise normal, there may occur at the time corresponding to ovulation, a variable amount of uterine hemorrhage. Usually it does not amount to more than a bloody vaginal discharge of a few hours' to two or three days' duration. Occasionally, however, it is as long and profuse as the regular menstrual flow from which it is clinically indistinguishable. It is only by taking several successive endometrial specimens in these cases that one can differentiate ovulation bleeding from true menstruation. It is an in-

teresting fact of diagnostic value that when the menstrual period is associated with dysmenorrhea, the ovulation bleeding is free of all pain. Although ovulation bleeding is very common in monkeys, it occurs infrequently in women. It may appear suddenly, last a few months and then disappear; or it may persist for several years.

5. *Cyclical (Anovulatory) Bleeding*.—In recent years it has become increasingly evident that not all periodic bleeding is necessarily true menstruation. The latter requires the previous occurrence of ovulation, the formation of a corpus luteum and bleeding from a secretory endometrium. But periodic bleeding may also occur from a proliferative endometrium. It then represents an anovulatory cycle. This type of bleeding is associated with sterility, first because the failure of ovulation prevents the liberation of a mature ovum, and second, because the absence of the corpus luteum prevents the conversion of the proliferative endometrium into a pregravid (secretory) type.

MECHANISM OF BLEEDING

Our concept of the menstrual cycle was presented schematically in a previous paper published in this JOURNAL (29: 771). Estrin dominates the first half of the cycle and stimulates proliferation of the endometrium. Under normal conditions, ovulation occurs when the endometrium has been completely built up. The transformation of the ruptured follicle into a corpus luteum is due to the action of the luteinizing hormone and follows ovulation. The hormone of the corpus luteum dominates the second half of the cycle and brings about the formation of a secretory endometrium.

The actual cause of menstrual bleeding is not definitely known. Four possible factors may be considered, namely, the myometrium, the endometrium, the ovary, and the anterior pituitary gland.

A. The *myometrium*, at first thought, might appear to be of importance in controlling menstrual bleeding because of the rôle the uterine muscle plays in checking postpartum hemorrhage. It is, of course, true that the development and maintenance of the myometrium are dependent upon the follicular hormone. However, in cases of uterine hypoplasia, amenorrhea rather than menorrhagia is the rule. This is because ovarian hypofunction is usually the common underlying factor in both uterine hypoplasia and amenorrhea. Occasionally, uterine hypoplasia is associated with excessive bleeding but here the fault may lie in the inability of the myometrium to respond to an otherwise adequate ovarian stimulus. While uterine bleeding may, at times, be temporarily diminished by the administration of oxytocic drugs (pituitrin, ergot), there is no evidence to support the view that the primary or major cause of the bleeding is a failure of contractility.

B. The *endometrium* demands careful consideration not only because it is the site of the bleeding but also because it reflects the activity of the ovaries. Examination of the endometrium has been facilitated by the use of a modified Klingler-Burch (1932) suction curette (Fig. 1). By this method it is possible to obtain specimens of endometrium at

different stages in the menstrual cycle. It is a simple and almost painless office procedure that obviates the need for curettage under anesthesia and gives satisfactory specimens.

A survey of our material consisting of over 600 specimens from cases of functional menstrual disorders reveals that there are basically only four types of endometrium: proliferative, transitional, secretory, and menstrual. The normal endometrium goes through the complete ovulatory cycle. The transitional endometrium reflects the changes during ovulation and represents the transformation from the proliferative to the secretory phase. Failure of ovulation results in the persistence of the proliferative phase. If the action of the follicular

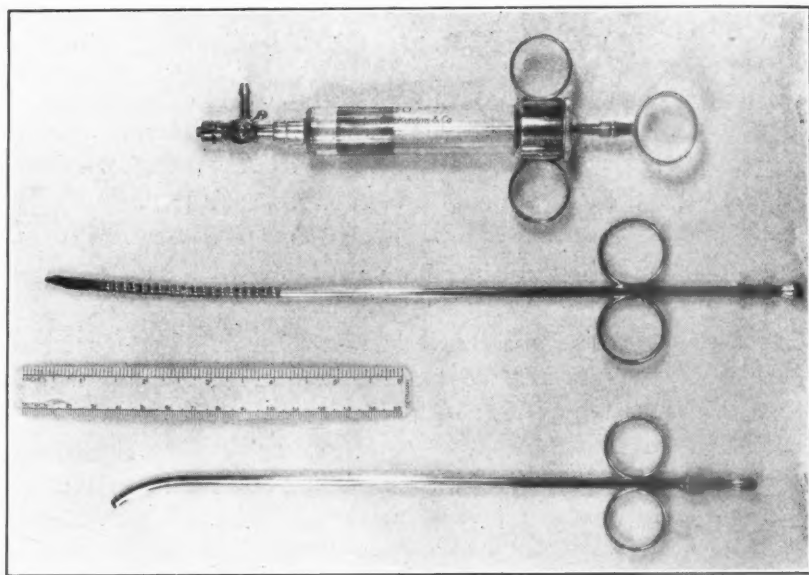


Fig. 1.—Modified suction curettes for the removal of endometrial biopsies. (A.) As modified by Kurzrok. The end of the cannula has a moderately sharp edge. It is moved along the surface of the endometrium and suction is exerted by means of the syringe. A specimen is removed from each of the uterine walls. (B.) As modified by Cassidy. The end of the cannula is flexible, and it is inserted through the cervix by rotating the cannula counter-clockwise until the fundus is reached. It is then removed slowly from the uterine cavity by rotating clockwise and, at the same time, suction is exerted. (C.) Syringe with automatic lock and two-way valve.

hormone is prolonged and unopposed by progestin, cystic and glandular hyperplasia of the endometrium results. The latter is thus only an exaggerated form of a proliferative endometrium. The cycle of events may be summarized as follows:

1. *Anovulatory Cycle*: proliferative endometrium → cystic and glandular hyperplasia.
2. *Ovulatory Cycle*:
 - a. proliferative endometrium (pre-ovulation) →
 - b. transitional endometrium (co-ovulation) →
 - c. secretory endometrium (postovulation).

Anspach and Hoffman (1934) previously reported that there was no single type of endometrium constantly associated with either functional bleeding or amenorrhea. The following case reports completely confirm their view:

CASE 1.—*Anovulatory Bleeding—Proliferative Endometrium.*—H. N., aged thirty-three, para ii, last pregnancy 1925. Menses regular from onset at thirteen years until 1932 when alternating amenorrhea and polymenorrhea ensued. Biopsies during bleeding and amenorrheic stages always showed a proliferative type of endometrium (Fig. 2, A). An endometrial specimen taken while the patient was bleeding after a two months' period of amenorrhea showed cystic dilatation of the glands (Fig. 2, B). The latter is explained on the basis of prolonged and unopposed follicular hormone action.

CASE 2.—*Puberty Bleeding—Cystic and Glandular Hyperplasia.*—J. L., aged nineteen, single, onset of menses at fifteen years, cycle always irregular varying from a two to six weeks' interval with a profuse flow of from four to ten days' duration. Patient bled profusely and continuously from Dec. 5, 1932, to Jan. 10, 1933, and the hemoglobin dropped to 40 per cent. Urine examination showed no follicular or follicle-stimulating hormones. Curettage revealed cystic and glandular hyperplasia of the endometrium (Fig. 3, A). The bleeding stopped after intensive pregnancy urine extract therapy (Follutein—Squibb*). Five blood transfusions were necessary to combat the anemia. There was no bleeding for eight months when another short episode of profuse bleeding ensued. This was readily controlled again by the gonadotropic fraction of pregnancy urine (follutein) and the treatment was continued for three months after the bleeding had stopped. There has been no bleeding since (eighteen months). A biopsy taken after fourteen months of amenorrhea revealed the persistence of the cystic and glandular hyperplasia. Urine examination at the same time showed no follicular hormone but the presence of follicle-stimulating hormone. Klingler and Burch (1933) and Rock (1935) have noted that a secretory endometrium failed to develop after the bleeding was stopped by the administration of pregnancy urine extract. Thus, the cessation of the bleeding cannot be attributed to luteinization.

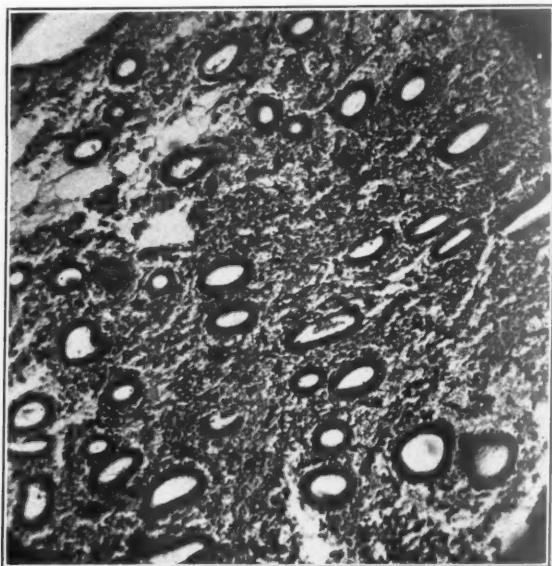
CASE 3.—*Continuous Bleeding for Eleven Years—Cystic and Glandular Hyperplasia.*—C. P., aged twenty-four, menses began at thirteen years, patient bleeding continuously ever since. The bleeding varies from a profuse flow to staining but the patient is never entirely clean. Hemoglobin 65 per cent. No pregnancies although married three years. Patient was curetted three times in the past four years because of the profuse bleeding. The endometrium has persistently shown marked cystic and glandular hyperplasia. The patient was given daily intravenous injections of prephysin† (1 to 2 c.c.) for twelve days beginning July 8, 1935. No bleeding since July 23, 1935, except for slight staining from Oct. 12, 1935, to Oct. 17, 1935. Biopsy during the amenorrheic phase (Sept. 17, 1935) shows the persistence of the cystic and glandular hyperplasia (Fig. 4, B). The cessation of the bleeding following intravenous anterior pituitary extract cannot, therefore, be attributed to luteinization. Incidentally, this patient had a severe and persistent facial acne which spontaneously disappeared soon after the bleeding stopped.

CASE 4.—*Maturity Bleeding—Cystic and Glandular Hyperplasia.*—M. P., aged thirty-three, married twelve years, never pregnant. Onset of menses at fourteen

*We are indebted to Dr. J. J. Durrett of E. R. Squibb & Sons for his generosity in supplying us with the follutein used in the treatment of our patients.

†We are indebted to Dr. A. E. Meyer of the Chappel Brothers Laboratory, Rockford, Ill., for his generosity in supplying us with prephysin. This preparation contains the gonadotropic hormones from the anterior hypophysis (1 c.c. = 25 R.U.)

years. Regular first six months only; periods then became totally irregular, alternating between amenorrhea and profuse bleeding. For the past ten years the bleeding has been almost constant though not always profuse. The patient presents marked



A.



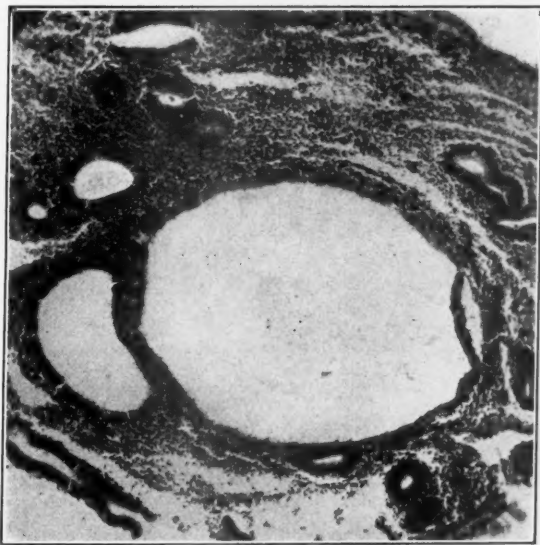
B.

Fig. 2.—Case 1. H. N. *Anovulatory bleeding, proliferative endometrium.* (A.) The previous two periods have occurred after a four-week interval. No premenstrual phase. Proliferative phase present during cyclical bleeding, hence no corpus luteum formation. Biopsy taken two days before a twelve-day flow. (B.) Biopsy taken while patient was bleeding after an eight-week interval. Cystic dilatation of the glands is explained on the basis of prolonged and unopposed follicular hormone activity.

adiposity of the trunk type. Urine examination shows no follicular hormone but follicle-stimulating hormone is present. Curettage on Jan. 9, 1933, and numerous biopsies since have persistently shown cystic and glandular hyperplasia. Moderately intensive treatment with pregnancy urine extract converted the almost continuous flow into periodic bleeding but without accompanying change in the endometrium.



A.

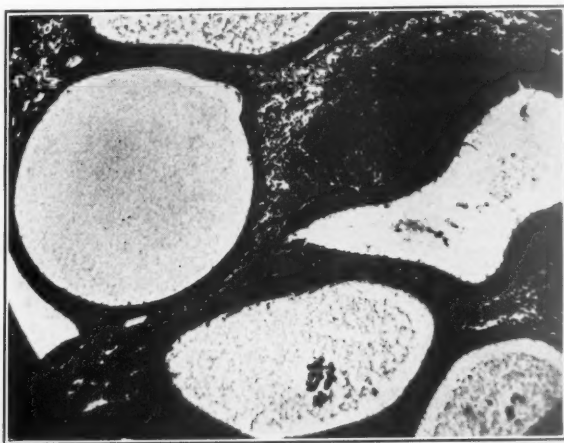


B.

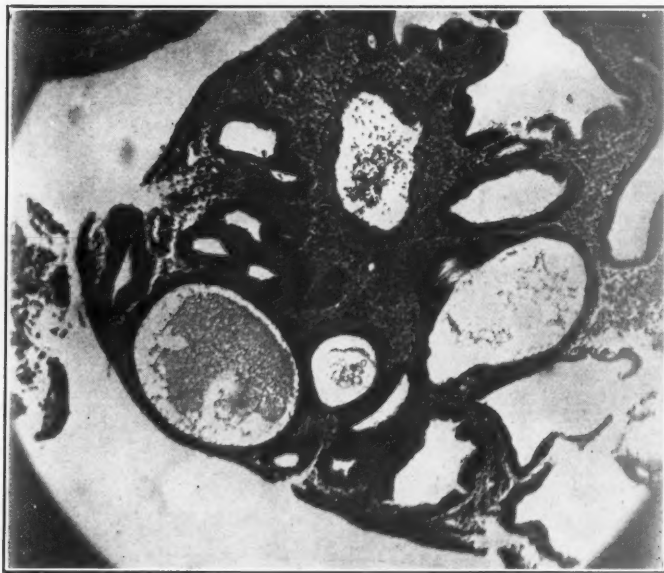
Fig. 3.—Case 2. J. L. Puberty bleeding, cystic and glandular hyperplasia of the endometrium. (A.) Cystic and glandular hyperplasia of the endometrium during active bleeding. (B.) Persistence of the same type of endometrium after fourteen months of amenorrhea. Treatment with large doses of follutein stopped the flow. The bleeding has not recurred, and it is now eighteen months since the last flow.

Thus again the improvement in the bleeding cannot be attributed to luteinization. The patient is now receiving synthetic progestin to ascertain whether the hyperplastic endometrium can be converted into a secretory type.

CASE 5.—*Ovulation Bleeding—Transitional Endometrium.*—M. S., aged twenty-six, "menstruated" every two weeks during the past year, previously once in four



A.



B.

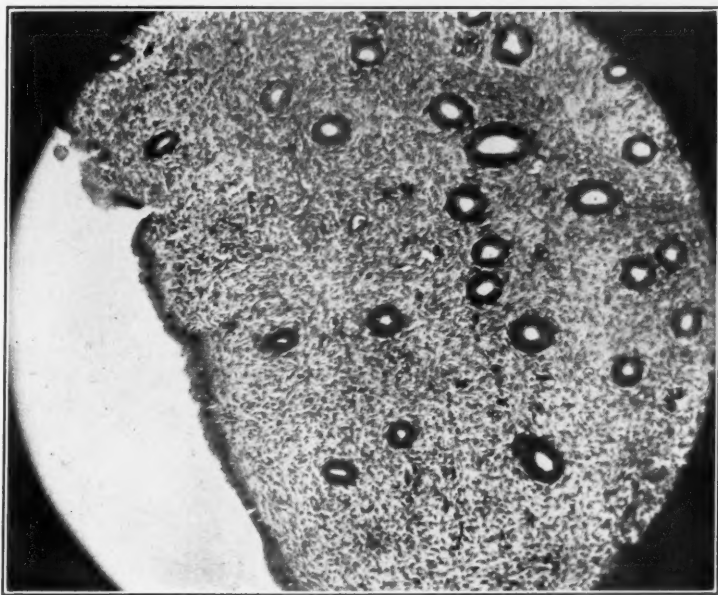
Fig. 4.—Case 3. C. P. *Cystic and glandular hyperplasia of the endometrium. Treatment with prephysin.* (A.) The histologic picture during active bleeding (typical "swiss cheese" type). (B.) Persistence of the same morphologic characteristics during a two-month period of amenorrhea. Note complete absence of premenstrual phase.

weeks. Each profuse period is followed with considerable regularity by a scanty flow. Dysmenorrhea occurs only with the profuse period. Biopsy on the twenty-fourth day of the cycle revealed a secretory endometrium (Fig. 5, A). The ovula-

tion bleeding lasted from the seventeenth to the twenty-third day. The next profuse period began twenty-eight days after the onset of the previous profuse flow. Another biopsy taken on the first day of the ovulation period (eleventh day of the cycle) showed a proliferative endometrium (Fig. 5, *B*). This patient, therefore, had a normal twenty-eight-day endometrial cycle. The profuse flow represented the true



A.



B.

Fig. 5.—Case 5. M. S. *Ovulation bleeding*. (A.) Ovulation bleeding from the seventeenth to the twenty-third day. Biopsy on the twenty-fourth day. Note premenstrual type of endometrium. (B.) Ovulation bleeding from the eleventh day to the fourteenth day of the cycle. Biopsy on the eleventh day. Note postmenstrual type of endometrium.

menstrual period and the scanty flow the ovulation bleeding. It will also be seen that the ovulation bleeding did not occur on the same dates on two successive months.

CASE 6.—Maturity Bleeding—Secretory Endometrium.—B. B., aged twenty-eight. Hyper- and polymenorrhea past seven months. Menses previously regular since onset at fifteen years. Biopsy on the second day of a ten-day period revealed a well-developed secretory endometrium (Fig. 7). Biopsy on the fourth day of the following period (eight days' duration) showed the presence of an early proliferative endometrium. The regeneration of the endometrium, thus, appears to take place despite the continuation of the bleeding. Under pregnancy urine extract therapy (600 R.U. per week) there has been a gradual return to a normal cycle with a more moderate flow of five days' duration.

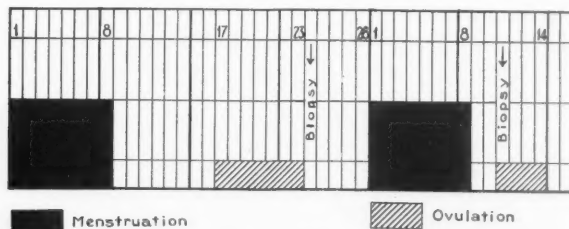


Fig. 6.—Case 5. *Ovulation bleeding.* Graph illustrating temporal and quantitative relationship between menstruation and ovulation bleeding. Note that ovulation did not occur at the same time on two successive months.

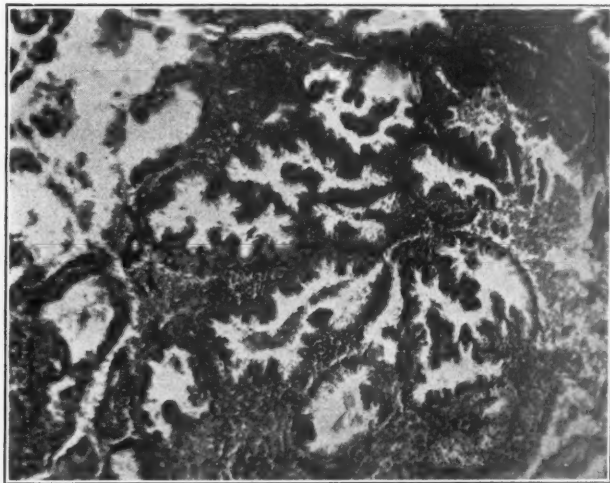


Fig. 7.—Case 6. B. B. *Maturity bleeding; secretory endometrium.* Biopsy on the second day of a ten-day menstrual flow. Prolonged and profuse bleeding from a secretory endometrium.

CASE 7.—Secondary Amenorrhea—Bleeding from a Proliferative Endometrium.—M. S., aged thirty, amenorrhea six months' duration, menses previously regular since onset at fourteen years. No atrophy of genital organs or breasts. Biopsy taken three days before the onset of a flow described by the patient as a typical menstrual period, revealed a proliferative endometrium of slight activity ("resting endometrium") (Fig. 8).

CASE 8.—Secondary Amenorrhea—Cystic and Glandular Hyperplasia.—C. G., aged twenty-six, onset of menses at ten years, regular until seven years ago when oligomenorrhea and obesity developed. No period for seven months. Married nine

years and never pregnant. Basal metabolic rate—minus 56 per cent (repeated) but no signs of myxedema. Urine examination revealed 9 R.U. follicular hormone per liter and no follicle-stimulating hormone. Biopsy showed marked cystic and glandular hyperplasia of the endometrium (Fig. 9).

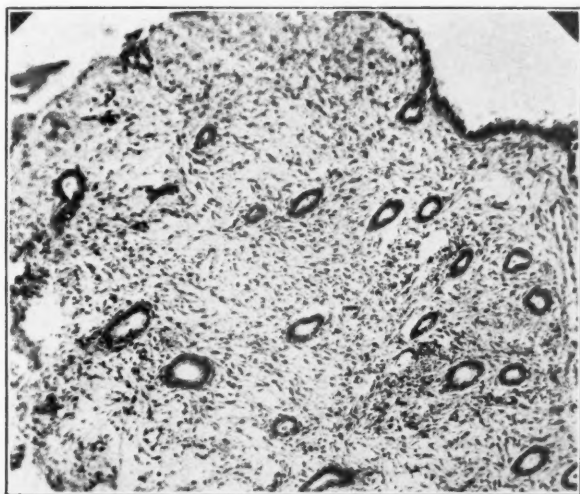


Fig. 8.—Case 7. M. S. *Secondary amenorrhea: bleeding from proliferative endometrium.* Biopsy taken three days before onset of period.



Fig. 9.—Case 8. C. G. *Secondary amenorrhea. Cystic and glandular hyperplasia of the endometrium.* Biopsy taken after amenorrhea of seven months. No previous history of excessive bleeding, but on the contrary, oligomenorrhea.

CASE 9.—*Secondary Amenorrhea—Secretory Endometrium.*—S. M., aged thirty-five, amenorrhea of two years' duration. Menses always irregular since onset at fourteen years. No genital hypoplasia. Normal hormone findings in urine (follicle-stimulating hormone, negative; 10 to 40 R.U. follicular hormone per liter). Basal

metabolic rate minus 4 per cent. Biopsy revealed a secretory endometrium (Fig. 10). Scanty periods resulted from the administration of large doses of progynon-B but bleeding stopped after discontinuation of treatment.

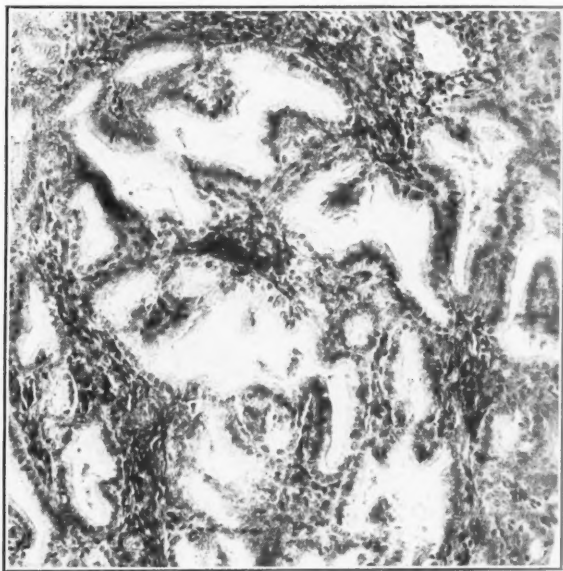


Fig. 10.—Case 9. S. M. *Secondary amenorrhea. Secretory endometrium.* Biopsy taken during amenorrhea reveals secretory endometrium. At other "periods" has very faint staining lasting several hours, from a premenstrual endometrium.

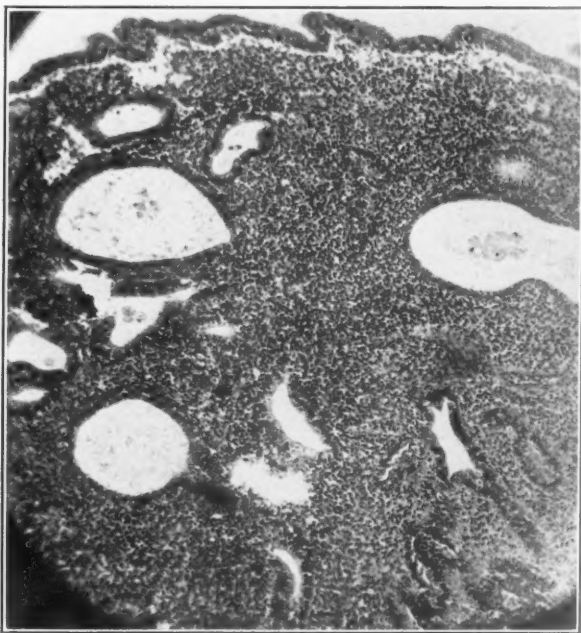


Fig. 11.—Case 10. W. U. *Secondary amenorrhea (x-ray castration).* Experimental production of cystic and glandular hyperplasia of the endometrium. 700,000 R. U. of progynon-B given.

CASE 10.—*Secondary Amenorrhea (X-Ray Castration)—Experimental Production of Cystic and Glandular Hyperplasia of the Endometrium.*—W. U., aged forty-five, diabetes mellitus of nineteen years' duration, x-ray abortion five years ago followed by severe menopause symptoms, genital atrophy and aggravation of diabetes. During the past eighteen months the patient has received a total of 700,000 R. U. of progynon-B. This has afforded complete relief from her menopause symptoms. In addition, there has been considerable improvement in her diabetic condition. The uterus, breasts, and external genitalia have come up to full development and irregular periodic bleeding has occurred. Biopsy of the endometrium reveals cystic and glandular hyperplasia, which has been artificially produced in this case by the administration of huge doses of follicular hormone (Fig. 11).

CASE 11.—*Primary Amenorrhea—Experimental Cystic and Glandular Hyperplasia.*—H. E., aged twenty-five, never menstruated, infantile uterus and slightly hypoplastic breasts and external genitalia. No follicular hormone in urine; follicle-stimulating

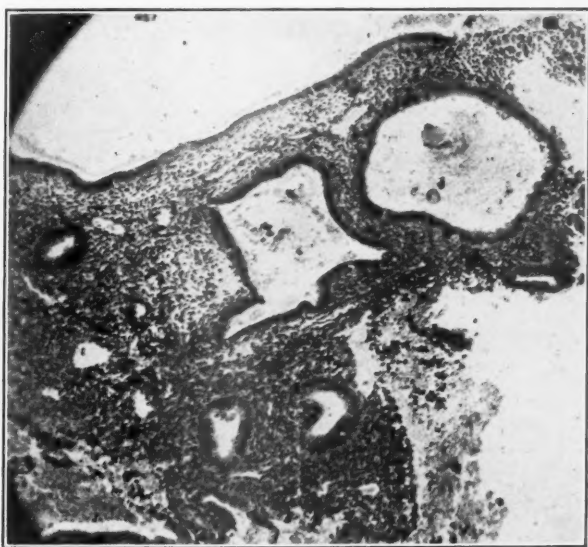


Fig. 12.—Case 11. H. E. *Primary amenorrhea. Experimental cystic and glandular hyperplasia of endometrium.* 70,000 R. U. of progynon-B given.

hormone present. These findings indicate that the amenorrhea was probably due to both partial failure of development of the müllerian duct system and subsequent cessation of gonadal function. Bleeding was induced by the administration of progynon-B. Endometrial biopsy following 70,000 R. U. over a period of eight weeks showed cystic and glandular hyperplasia (Fig. 12).

Functional uterine bleeding is thus completely independent of the type of endometrium. In functional amenorrhea the same endometrial independence also exists. And finally, the persistence of cystic and glandular hyperplasia of the endometrium long after the bleeding has been completely stopped by pregnancy urine or anterior pituitary extract definitely indicates that the cause of the bleeding must be sought for in some extraendometrial factor.

C. *The Ovarian Factor*.—It has been repeatedly demonstrated that uterine bleeding can be artificially produced in monkeys and women by the administration of follicular hormone. According to Allen (1927), menstrual bleeding is due to a drop in the blood level of follicular hormone. There are, however, the following objections to this view:

1. In cases of primary or secondary amenorrhea, bleeding has occurred while the patients were receiving large doses of follicular hormone *without interruption* (Werner and Collier; 1933; Kurzrok, Wilson and Cassidy, 1935).

2. In cases of functional uterine bleeding, the administration of large doses of follicular hormone not only failed to stop the bleeding but actually made it more profuse. On the basis of the withdrawal theory the maintenance of a high concentration of estrin should have prevented bleeding.

Smith, Engle, and Sheleenyak (1935) have shown that in monkeys, bleeding from a secretory endometrium can be inhibited by progestin but not by follicular hormone. They believe that menstrual bleeding is due to a waning supply of corpus luteum hormone. This explanation, however, cannot be applied to anovulatory bleeding because a corpus luteum is not formed.

D. *The Anterior Pituitary Factor*.—The work of Hartman, Firor, and Geiling (1930), however, has demonstrated that there can be no bleeding without the pituitary. Working with immature monkeys, they showed that the bleeding which follows the injection of estrin does not occur in the hypophysectomized monkey. But the injection of anterior pituitary extracts into such hypophysectomized monkeys brings about bleeding from a proliferative endometrium. From this they concluded that bleeding per se is due to a special nongonadotropic hormone in the anterior lobe of the hypophysis.

We believe that the evidence at present available points to the correctness of this concept, and we offer the following *hypothesis* of a *bleeding mechanism* as a single explanation of all functional or hormonal forms of uterine bleeding (normal and abnormal):

1. Bleeding per se is due to a special hormone elaborated by the anterior lobe of the hypophysis.

2. The bleeding hormone is separate and distinct from the follicle-stimulating and luteinizing hormones.

3. It is not gonadotropic but acts directly on the endometrium.

4. Its production is stimulated by the follicular hormone.

5. Its activity is inhibited but not destroyed by progestin.

6. The actual onset of bleeding occurs when a certain concentration of bleeding hormone has been reached, providing its action is not inhibited by corpus luteum hormone.

7. The bleeding stops when the bleeding hormone is exhausted.

Let us now apply this hypothesis to the various functional types of uterine bleeding.

A. *Normal (Ovulatory) Menstruation*.—Following menstruation an ovarian follicle begins to mature and to produce follicular hormone. The latter stimulates the formation of the bleeding hormone in gradually increasing amount. (A certain minimal quantity of bleeding hormone is necessary before bleeding can occur.) At about the middle of the cycle ovulation takes place and a corpus luteum forms. The secretion of progesterin now inhibits the activity of the bleeding hormone although the latter continues to be secreted because the corpus luteum also produces follicular hormone. Finally, when the corpus luteum begins to degenerate, the bleeding hormone is released. The bleeding continues until the supply of bleeding hormone is exhausted. With the onset of a new cycle, the process is repeated.

B. *Ovulation Bleeding*.—Due to a disturbed quantitative or temporal balance between the follicular hormone and progesterin, the bleeding hormone is released at the time of ovulation. The bleeding, however, soon ceases when enough progesterin is secreted to inhibit the activity of the bleeding hormone. The administration of 20,000 R.U. of follicular hormone within the first ten days of the cycle, for example, occasionally leads to spotting at about the middle of the cycle.

C. *Anovulatory Cyclical Bleeding*.—The failure of luteinization deprives the bleeding mechanism of its normal inhibitory influence. The bleeding will occur earlier than usual if all other factors remain the same, but may be delayed if the follicular hormone production is subnormal or if the pituitary does not respond with the production of bleeding hormone.

D. *Amenorrhea*.—Certain types of functional amenorrhea may be due to one or more of the following causes:

1. *Inadequate production of bleeding hormone* which might result from either of the following:

a. *Inadequate follicular hormone*: An insufficient amount of follicular hormone would not stimulate the anterior hypophysis sufficiently to produce the required amount of the bleeding factor. This explains the results obtained when follicular hormone is given *continuously* in large doses to cases of primary amenorrhea due to gonadal hypo- or nonfunction. When a sufficient amount of the bleeding factor has accumulated, bleeding occurs whether the administration of estrin is continued or not. Cases of secondary amenorrhea in which some follicular hormone is secreted thus require smaller doses.

b. *Failure of the pituitary to respond* to this stimulation. Some cases of amenorrhea, the so-called hyperhormonal types (originally described by Zondek, 1931), have up to the present time not been adequately explained. The patients fail to bleed in spite of high concentration of follicular hormone in the blood and urine. We believe that such cases are best explained by the assumption that the hypophysis fails to respond with the production of the bleeding factor in spite of the excess of follicular hormone. A gland may be stimulated, but whether it will respond is an entirely

different matter. This may also explain the cases of patients in whom menstrual bleeding never occurs, but who become pregnant and then deliver, and also those patients in whom pregnancy occurs while the patient is temporarily amenorrheic. This implies ovulation without menstruation.

2. *Excessive inhibition of bleeding hormone* (corpus luteum cyst): The removal of a corpus luteum cyst, or a functioning corpus luteum, is soon followed by bleeding because the inhibitor of the bleeding factor has been removed.

3. *Absence of endometrium*: In order that bleeding occur it is essential to have an adequate bleeding surface. Repeated curettage within a short period of time may cause the loss of sufficient endometrium, both in the basal and functional layers, to prevent bleeding. The suction curette is of real assistance in the diagnosis.

E. *Pregnancy*.—At the onset of pregnancy, bleeding is prevented by the inhibitory effect of progesterin. The corpus luteum of pregnancy continues to function much longer than it does in the menstrual cycle. Beginning at the time of nidation and continuing throughout pregnancy large quantities of prolactin A and B are produced by the placenta and excreted in the urine (positive Aschheim-Zondek Test). Judging by the effect of these hormones (pregnancy urine extract) in cases of functional uterine bleeding, it appears likely that their chief function in pregnancy is to prevent bleeding by inhibition of the bleeding hormone; this, in spite of the large quantities of estrin which are simultaneously produced. One is tempted to speculate that some hemorrhages during pregnancy may be due to a quantitative disproportion between estrin which tends to stimulate formation of the bleeding hormone and prolactin A and B which tends to inhibit it.

Menstruation is thus seen to be a complex process which depends for its normal occurrence upon the proper coordination of a mechanism consisting of:

1. The *anterior hypophysis*, which contributes the gonadotropic and bleeding hormones;
2. The *ovary*, which provides follicular hormone and progesterin; and
3. The *endometrium* which supplies the actual bleeding surface.

It must be remembered that the other endocrine glands may influence this mechanism probably by way of the anterior lobe of the hypophysis.

TREATMENT OF FUNCTIONAL UTERINE BLEEDING

Excessive functional bleeding may be controlled in any of the following ways:

1. *Removal of the Bleeding Surface*.—*Curettage* affords only a temporary control of the bleeding. In preclimacteric cases it should be employed routinely as a diagnostic measure in order to definitely exclude malignancy. In puberty bleeding, curettage should be limited because it is usually unnecessary and often produces an unpleasant

psychic effect on the patient. *Hysterectomy* today has no place in the treatment of functional bleeding, except perhaps in some of the preclimacteric cases.

2. *Removal of the Stimulus (Follicular Hormone) Which Produces the Bleeding Hormone.*—The stimulus for the secretion of the bleeding hormone may be removed by *castration*, either by operation or radiation. The latter is ideal for cases of preclimacteric bleeding but should never be used in younger women because it might result in permanent castration. *Oöphorectomy* also has no place in the treatment of functional bleeding. Resection of a portion of each ovary does not appear to be a rational procedure, for a part of an ovary may produce cystic follicles as well as the whole one. The cystic follicles are the result of abnormal pituitary function. (Furthermore, how much ovarian tissue should be removed?)

3. *Prevention of Bleeding Hormone Production.*—This may be accomplished by roentgen ray irradiation of the pituitary gland but is too dangerous a method. The exact effect of a given dosage of radiation on an individual patient is not accurately predictable and permanent damage may result when only temporary suspension of function is intended.

4. *Inhibition of the Activity of the Bleeding Hormone.*—This offers the best method to date of controlling functional uterine bleeding. The activity of the bleeding hormone may be effectively checked by the administration of extracts of the corpus luteum, pregnancy urine or the anterior lobe of the hypophysis. Potent corpus luteum extracts are not generally available because of their expense and limited supply. Adequate amounts of synthetic progestin should soon become available.

Practically every case of functional uterine bleeding can be controlled by pregnancy urine extract, providing the dosage is adequate. The average daily dose required during the stage of active bleeding is from 200 to 500 R.U. In very severe cases as much as 750 R.U. daily, in 2 or 3 divided doses, may be necessary. The injections are best given intramuscularly in the buttocks. When the bleeding ceases, the patient may be carried along on much smaller doses (200 R.U. once or twice a week) and this should be continued for several weeks or months. Following this treatment the periods may occur at fairly normal intervals. At first they may be prolonged and profuse, but continued treatment both shortens and lessens the flow. This is especially likely if the previously excessive flow was periodic in occurrence. On the other hand, if the bleeding was formerly more or less continuous, a prolonged period of amenorrhea may result. In some instances there has been no bleeding for well over a year. The value of such a prolonged period of amenorrhea is twofold. It relieves the

overworked hematopoietic system and gives the endocrine apparatus an opportunity to reestablish an equilibrium and later resume normal function.

The exact mechanism by which pregnancy urine extract controls functional bleeding has not as yet been definitely established. The absence of effect on the endometrium conclusively shows that the cessation of the bleeding cannot be attributed to luteinization. We believe that pregnancy urine extract acts directly on the anterior pituitary and causes an inhibition of the bleeding hormone.

Similar, although not as effective, results were obtained by the use of anterior pituitary extracts. They contain the gonadotropic hormones. In very severe cases, anterior pituitary extract (prephysin), in daily doses of 1 c.c., may be injected *intravenously*. This usually stops the bleeding promptly but the severe reactions that occur in some patients from this intravenous administration somewhat limit its use.

Certain *adjuvants* to the treatment of functional uterine bleeding are important. The anemia resulting from prolonged or excessive bleeding demands careful attention. In the milder cases, *iron* may be given. The severe cases often require one or more *blood transfusions*. If a pregnant donor can be obtained, not only are erythrocytes and hemoglobin supplied but also the anterior pituitary-like hormones. *Oxytocics* as pituitrin and ergot are occasionally of value especially when the bleeding is associated with uterine atony. Where the uterus is firm they are of no value.

SUMMARY AND CONCLUSIONS

1. Five types of *functional bleeding* are considered, namely, puberty, maturity, preclimacteric, ovulation, cyclical or anovulatory.
2. Menstruation is discussed from the viewpoint of the myometrium, the endometrium, the ovary, and the anterior pituitary gland.
3. Selected cases of functional bleeding are presented and these show that: (a) Functional uterine bleeding is completely independent of the type of endometrium. (b) Cystic and glandular hyperplasia of the endometrium persists long after the bleeding has stopped. (c) The cause of functional bleeding must be sought for in some extra-endometrial factor.
4. A *theory* to explain both menstrual and functional bleeding based on the assumed presence of a bleeding factor (or hormone) in the anterior pituitary gland is suggested.

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5. The treatment of functional bleeding by means of the pituitary-like hormones from pregnancy urine (prolan A and B) is discussed.

6. An explanation is offered for the function of prolan A and B during pregnancy.

REFERENCES

- Allen, E.: Contributions to Embryology, Carnegie Institution of Washington 19: 1, 1927. Anspach, B. M., and Hoffman, J.: AM. J. OBST. & GYNEC. 28: 473, 1934. Engle, E. T., Smith, P. E., and Shelesnyak, M. C.: AM. J. OBST. & GYNEC. 29: 787, 1935. Hartman, C. G., Firor, W. M., and Geiling, E. M. K.: AM. J. Physiol. 95: 662, 1930. Hohlweg, W., and Junkmann, K.: Pflüger's Arch. f. d. ges. Physiol. 232: 148, 1933. Klingler, H. H., and Burch, J. C.: J. A. M. A. 99: 559, 1932. Klingler, H. H., and Burch, J. C.: AM. J. OBST. & GYNEC. 26: 17, 1933. Kurzrok, R., Wilson, L., and Cassidy, M. A.: AM. J. OBST. & GYNEC. 29: 771, 1935. Rock, J.: Endocrinology 19: 269, 1935. Teel, H. M., and Cushing, H.: Endocrinology 6: 401, 1930. Werner, A. A., and Collier, W. D.: J. A. M. A. 100: 633, 1933. Zondek, B.: Die Hormone des Ovariums und des Hypophysenvorderlappens, Berlin, 1931, J. Springer.

INCIDENTAL BLINDNESS IN PREGNANCY*

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A RECENT experience with blindness following the administration of quinine for the induction of labor prompted us to investigate the frequency of blindness associated with pregnancy observed in our clinic services. In reviewing our data, we found that in the last ten years 6 cases of blindness occurred in 3,355 patients of the Lane Hospital Service, and one in 2,920 patients of the Stanford Service of the San Francisco Hospital. Of these, 4 occurred in the prenatal period, 2 during labor, and 1 during the puerperium.

When blindness occurs during pregnancy, it is usually one of a number of manifestations resulting from a disturbed body mechanism. Bergmann¹ pointed out that pregnant women are particularly susceptible to various forms of visual impairment because of nutritional disturbances occasioned by a faulty metabolic mechanism. It is therefore not surprising that we find the greatest number of cases of blindness occurring in association with the various types of toxemia of pregnancy.

BLINDNESS IN PERNICIOUS VOMITING

In Wagener's² opinion, lesions of the retina and optic nerve, though rather rare, may be of more frequent occurrence in pernicious vomiting than is generally assumed. According to him, the presence of retinal hemorrhages is an indication of a serious general toxemia. Optic or retrobulbar neuritis, with rapid loss of vision, may occur in the more severe types of pernicious vomiting, with symptoms of pe-

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ripheral nerve disturbance. Stander³ advises immediate termination of pregnancy in all instances where a hemorrhagic retinitis complicates pernicious vomiting. Wagener² believes that in pernicious vomiting an optic neuritis is usually a terminal manifestation and that death will occur in spite of immediate interruption of pregnancy. He reports a case in which complete blindness occurred within thirty-six hours after the onset of the eye symptoms. This condition, with paralysis of the extraocular muscles, persisted even after termination of pregnancy, and death occurred a few days later. The following case reported here likewise ended fatally in spite of interruption of pregnancy:

CASE 1.—Mrs. C. Z., aged thirty-three, gravida ii, para i, was admitted to the Stanford Obstetrical Service of the San Francisco Hospital in the fourth month of her pregnancy. Nausea and vomiting had begun one and one-half months previously, and persisted and increased in severity up to the time of admission. Drastic treatment was instituted immediately upon entrance to the hospital. The patient, however, continued to fail, and complained of general weakness and tenderness of all her muscles. Visual disturbances developed shortly after admission. Her blood pressure was 105/70, the urine was negative except for acetone, and the CO₂ tension of the blood was 49. Eyegrounds showed slight blurring of the left disc on the temporal side, and a small fresh hemorrhage along the vein of the right. One week later vision had almost completely failed. Examination at that time showed several fresh fan-shaped hemorrhages of both retinæ, the largest appearing near the inferior retinal nerve on the left. A diagnosis of toxic neuronitis and hemorrhagic retinitis was made, and because of progressive symptoms termination of pregnancy was advised. An abdominal hysterotomy was done but the patient's symptoms persisted until vision failed completely, and death occurred three days later.

At autopsy the brain showed a moderate increase of the subarachnoid fluid, markedly congested cortical vessels, a slight shrinking of the gyri, and widening of the sulci. Microscopic examination showed multiple small hemorrhages, both old and fresh in the gray matter, especially about the third ventricle. A diagnosis was made of hyperemesis gravidarum with multiple peripheral neuritis, cerebral neuritis, hemorrhagic retinitis, unilateral hydronephrosis, and terminal bronchopneumonia.

The severity of the condition in this patient undoubtedly was not recognized until the eye findings were well advanced and a diagnosis of hemorrhagic retinitis made. Stander³ reports two similar cases. The second of these, in which the pregnancy was allowed to continue eight days following the first appearance of hemorrhages into the retinæ, was also fatal. Two of three cases recently reported by Tillman⁴ showed petechial hemorrhages and miliary focal necrosis in the brain at necropsy, similar to those found in the case presented.

BLINDNESS IN THE TOXEMIAS

According to Douglas and Griffiths,⁵ visual disturbances observed with any of the toxemias may be of either extraocular or intraocular origin. When extraocular, it may be occasioned by a retrobulbar or optic neuritis, but it more commonly manifests itself as some disturbance of the optical cortex of the occipital lobe.

According to Wagener,² the latter is the usual point of origin in the more typical types of eclamptic amaurosis. Schiötz⁶ attributed the cerebral pathology to a transi-

tory edema of the visual centers. In these types, sudden blindness may occur without evidence of retinal affection, with the possible exception of a slight narrowing of the vessels and pallor of the discs. Visual disturbances of extraocular origin may begin early in pregnancy and progress to complete amaurosis. It is important to note that sudden blindness may be the first manifestation of an existing toxemia and that it may occur in the complete absence of any other signs of toxemia. Such cases were reported by Swift and Tostevin,⁷ Schiötz,⁶ and Bailliart and Hartmann.⁸ These authors emphasize that in making a diagnosis all other factors must be excluded before blindness can be explained solely on the basis of an obscure toxemia.

The intraocular forms of amaurosis manifest themselves either as a neuroretinitis with hemorrhages and exudates, or as an edema of the retina frequently accompanied by retinal detachment.

Stander and Peckham⁹ believe that the former is diagnostic of chronic nephritic toxemia, and the latter of acute toxemias. Wagener,² however, substantiating the reports of Schiötz⁶ and Corwin and Herrick,¹⁰ believes the difference in intraocular pathology is one of degree rather than of type and that either can occur in any form of toxemia in which hypertension is a feature. The work of Wolff and Zade¹¹ further shows that both these lesions occur much more frequently in chronic nephritic toxemia.

The factor resulting in the production of these various retinal lesions is still unknown.

Cheney¹² favors Volhard's¹³ theory that simultaneous changes may affect the entire arteriolar system and especially that of the retina and kidney. Mylius¹⁴ demonstrated conclusively that these changes were primarily spastic, with resulting ischemia, and organic changes, which may occur later. He also showed that these changes preceded the retinitis and were in all probability the local cause of this condition. Parity has no particular bearing upon the occurrence of such retinal lesions, for they occur as frequently in multiparas as in primiparas. Both eyes are usually affected, and by far the greater number of cases occur in the last trimester. Fry,¹⁵ in analyzing a group of 21 cases, found 15 with bilateral and 6 with unilateral involvement. Burnier¹⁶ reports that in a group of 119 patients, 71 per cent of the eye disturbances developed in the last three months, 21 per cent before the sixth month, and 8 per cent in the puerperium.

The frequency of neuroretinitis in general was estimated by Silex¹⁷ as 1:3,000, while Black¹⁸ found varying degrees of retinal involvement in 1:40 patients with albuminuria. Cumston¹⁹ reports that retinal detachment occurs in 17 per cent of all cases of retinitis.

Return to normal vision after blindness due to either extraocular or intraocular lesions is entirely dependent upon the persistence of the local pathology. If the pathology involves the optic cortex only, permanent nerve changes are rare, even in the more severe forms, because of the usually short duration of the condition. In simple detachment of the retina, spontaneous and rapid reattachment usually follows the termination of pregnancy. However, if blindness is caused by a retinitis the visual prognosis is entirely dependent upon the damage created by residual changes. Burnier,¹⁶ Silex,¹⁷ and Rochon-Duvigneaud²⁰ report a high percentage of permanent visual disturbance or total blindness in all patients with neuroretinitis who were allowed to

go to term. The nearer to the end of pregnancy that amaurosis associated with toxemia occurs, the more favorable is the prognosis for complete recovery of vision. However, it is always a sign of a grave toxemia and, with few if any exceptions, immediate interruption of pregnancy is imperative.^{1, 12, 21-25}

Recurrence of a retinitis or a retinal detachment in a succeeding pregnancy is comparatively rare. Rochon-Dunigneaud²⁰ found that only 6 out of 19 patients in whom other symptoms of a toxemia reappeared, showed evidence of recurrent retinal disturbance.

Of the 7 cases of blindness reported by us, 4 are attributable to toxemia other than that accompanying pernicious vomiting. Of these, 3 occurred with an acute toxemia and 1 with the chronic nephritic type. The underlying pathology was extraocular in 2 and intraocular in 2, although one of the latter also had symptoms suggestive of cerebral involvement. Three occurred in the last month of pregnancy, and 1 at the end of the sixth month.

CASE 2.—Mrs. M. B., aged thirty-nine, gravida iv, para iii, applied for admission to the Stanford Women's Clinic during the ninth month of her pregnancy. She had had no previous medical care, and at the time of admission complained of rapidly failing vision which first manifested itself three days previously. She stated that swelling of her lower extremities had been present for about three weeks. Her blood pressure was 208/108, and her urine boiled solid. She was immediately sent to the hospital but shortly after admission vision failed completely and a severe convulsion occurred. Stronganoff treatment, with phlebotomy (500 c.c.), was instituted and an intravenous injection of 1,000 c.c. of glucose was given. Two hours later a second generalized convulsion occurred, and termination of pregnancy as an extreme emergency was considered necessary.

A classical abdominal section was performed and a full-term, living infant delivered. The patient's condition remained satisfactory throughout the procedure, and on the second postoperative day showed marked improvement, with definite return of vision. Examination of the fundi on the day following operation revealed normal discs and the absence of edema and hemorrhages, but the retinal veins were still engorged.

A diagnosis of amaurosis complicating an eclamptic toxemia was made, and the patient was dismissed on the fourteenth day of her puerperium in satisfactory condition.

CASE 3.—Mrs. C. S., gravida i, aged nineteen, entered the hospital one month before term because of a steadily rising blood pressure and albuminuria. Castor oil and quinine were given for induction of labor, without apparent result.

The following day the patient was unable to see and later was unable to answer questions. There was definite twitching of the eyelids and the right hand. Her blood pressure was 160/105, and there was an increased amount of albumin in the urine. Bag induction was advised, but because of a well thinned-out cervix already dilated to 4 cm., manual dilatation was employed, permitting version and extraction of a dead fetus. Two days after delivery the fundi were found to be normal except for one small hemorrhage in the upper temporal part of the right retina and another at the crossing of the vein with the artery in the same eye. By the fifth day postpartum vision apparently had completely returned to normal, all trace of albumin

had disappeared, and the blood pressure had fallen to 126/80. A diagnosis of pre-eclamptic toxemia was made. When the patient was seen in the postpartum clinic one month later, her general condition was found to be normal, blood pressure 125/75, and vision completely recovered.

CASE 4.—Mrs. M. R., a primipara, aged twenty, entered the hospital two weeks before term, complaining of swelling of both ankles which had been present for three weeks. Epigastric pain and astynopia had been present for one week. Her blood pressure was 170/110, and her urine showed a heavy cloud of albumin, with many casts. A diagnosis of pre-eclamptic toxemia with nephrosis was made. Because of rapidly failing vision and diplopia, labor was induced with a Voorhees' bag. The labor itself was uneventful, lasting seven and one-half hours. Immediately following delivery the patient became totally blind, and an investigation of the retinae showed a distinct pallor of both discs, with compressed vessels and enormous bilateral edema. The chorion of both eyes was mottled, but there was no demonstrable elevation of the discs.

Twenty-four hours later her general edema had definitely diminished, and her blood pressure had fallen to 148/96. She then could recognize objects at a distance of three feet. On her seventh day postpartum her vision was still impaired. It was recorded as R. 15/40, and L. 15/30. Pallor of the discs, constricted arteries and veins, and edema of the retinae were present, but improved. There was still some visual impairment on the seventeenth day postpartum, but recovery was complete seven weeks after delivery.

CASE 5.—Mrs. M. T., aged forty-four, gravida ix, para vii, was referred to us at the end of the sixth month of pregnancy. Her physician reported that generalized edema, blurred vision, dizziness, occipital headaches, backache, tingling in her arms, and a generalized tired feeling had appeared suddenly three days previously. Her past history was unessential except for a unilateral oophorectomy at the age of thirty-six. So far as we could learn, all of her previous pregnancies had been normal except for the last two, one of which terminated in premature labor and the other in a spontaneous abortion. In her present pregnancy, profuse uterine bleeding occurred in the third month and subsided spontaneously after ten days.

On admission, the blood pressure was 220/140, rising to 255/160 by evening of the same day. The urine was loaded with albumin, and the blood urea had risen to 53.3 mg. Hemoglobin was 52 per cent, with a red cell count of 1,060,000. There was complete failure of vision. Fetal heart sounds were absent. Immediate termination of pregnancy by trachelohysterotomy yielded a macerated fetus. Ophthalmoscopic examination at this time showed bilateral edema of the discs with multiple hemorrhages and exudates, tortuosity of the vessels, and serous retinal detachment of the lower temporal quadrant of the right eye. By the fourth day postpartum vision had partially returned and her general condition had improved, although headaches persisted. At the time of dismissal (fourteen days postpartum) her blood pressure had fallen to 130/100. On her return to the postpartum clinic one month later, however, it had again risen to over 200/150, and there was still some impairment of vision of the right eye.

Cases 2 and 3 are typical of the transitory blindness described by Wagener² as that more commonly seen with acute eclampsia, and attributed by Schiötz⁶ to a probable transitory edema of the optic centers in the occipital lobes. Both showed essentially negative eye findings.

In Case 4 the findings are not clear because of a recorded diplopia. Although there was also present a marked edema of the retina, this case probably should be considered a mixed type in which the underlying pathology is both extraocular and intraocular. In Case 5, however, the pathology underlying the amaurosis was intra-

ocular, as evidenced by a neuroretinitis. Rapid and complete restoration of vision occurred in the case of the fourth patient, while definite residual disturbances were found in that of the fifth, in whom there were also evidences of permanent kidney damage. These two cases substantiate the view of Stander and Peckham⁹ that the retinal edema more frequently accompanies an acute toxemia and that a neuroretinitis usually is diagnostic of a chronic nephritic type.

AMAUROSIS WITHOUT DEMONSTRABLE PATHOLOGY

Graef²¹ and Bergmann¹ call attention to the possibility of the emotional influence of pregnancy on the functional behavior of a patient. Such reactions may range from fatigue or distress of the eyes, multiple vision, sensitivity to light, or modified fields of vision, to absolute blindness. Complete absence of any evidence of physical pathology suggests the possibility of hysteria. Both authors, however, emphasize that one must remember that the existence of a circulatory or toxic disturbance of a very low grade is readily overlooked, and that the diagnosis of hysteria requires a most rigid and unbiased investigation. Our experience with this type of case is limited to one instance.

CASE 6.—Mrs. M. H. S., aged twenty-seven, of Latin American extraction, was admitted to Lane Hospital at term for induction of labor. She had miscarried during her only previous pregnancy, and aside from an appendectomy in 1922, had a negative past history. Her blood pressure on admission was 110/65, hemoglobin 75 per cent, and urine negative. Induction of labor was decided upon because of a flat pelvis. Pains, however, began spontaneously. The patient was noted to be extremely restless during her labor, which was only partially controlled by Gwathmey analgesia. Midforceps were used following complete dilatation because of definite dystocia, and a stillborn female infant was delivered with some difficulty. Shortly after delivery the patient complained of buzzing in her head, followed the next day by inability to see. Her pupils then were dilated and did not react to light. However, both fundi were normal except for slight venous dilatation. In the absence of other findings, a diagnosis of hysteria was made. The patient recovered normally, but complained of visual difficulties when dismissed from the hospital on the fourteenth day. Three months later she was readmitted, complaining of total blindness. The eye findings remained unchanged, but because of a possibility of quinine intoxication during delivery, she was tested, and found negative to quinine hydrobromide. X-rays of the skull and sinuses were negative. This patient, unfortunately, failed to report for further observation. We were told that her mother and an aunt both had an amblyopia persisting for three months following pregnancy. On further inquiry we learned that a brother in Guatemala was furnishing financial assistance as long as she was physically incapacitated. On further neurologic investigation, a diagnosis of hysteria in a constitutional inadequate with possible frank malingering, was made.

QUININE AMAUROSIS

The seventh case in this series is of particular interest because of its relation to quinine therapy so commonly used for induction of labor. Although visual disturbances are comparatively rare following the administration of quinine, temporary and permanent impairment of vision due to its toxic effect has been recorded.

Elliott²⁶ calls attention to several factors which enter into the toxic reactions caused by this drug. The most important of these is individual idiosyncrasy to quinine. In this connection he points to the increased susceptibility of patients who previously have shown a toxic reaction to quinine. Next in importance is the salt employed, the sulphate and hydrochloride of which are the least toxic and most often used. A further factor of importance is the vehicle in which the salt is administered. According to Evans,²⁷ the sulphate is twelve times more soluble in alcohol than in water. The other salts vary accordingly. Last, the method of administration deserves consideration because of differences in speed of absorption. It has been shown that more rapid and extensive absorption, with far greater danger from accumulative action, takes place when quinine is administered rectally rather than orally.²⁹

In quinine poisoning the disturbance in vision ordinarily follows a period of drowsiness. Bollack²⁸ states that it usually begins several hours after the drug is taken, and reaches its maximum in from seven to nine hours. Occasionally, however, the blindness may be immediate and complete. There is usually a diminution of central visual acuity, with amblyopia and contraction of the visual fields, followed by either partial or complete amaurosis. Both eyes are involved in the majority of cases. The pupil is described as fixed and dilated. Definite pallor of the disc, accompanied by extreme contraction of the retinal vessels, is usually present. This is frequently accompanied by retinal edema and the so-called "cherry spot" at the macula. Elliott²⁶ further adds that amaurosis may occasionally occur in the absence of any of these ophthalmoscopic findings.

The period of recovery varies from fourteen hours to ten weeks and longer. There is always a question of complete restoration of vision following an amaurosis due to quinine poisoning. Bollack²⁸ advises caution in prognosticating the outcome of such a case, since aggravation may occur after a certain period of apparent improvement. In his experience, the most constant sequela is the narrowing of the fields of vision with diminished sensitivity to light, especially peripherally, resulting in hemeralopia. We recently observed such an occurrence in our clinic.

CASE 7.—Mrs. D. S., aged nineteen, gravida i, was sent to the hospital for induction of labor at term. Her past history was essentially negative, and her pelvic measurements were normal. Except for the presence of a slight trace of albumin during the last prenatal month, nothing unusual had happened during the pregnancy. The day before admission she complained of cessation of fetal movements, and because no heart sounds could be obtained, a diagnosis of fetal death was made. Her blood pressure was then 135/90, her weight was 217½ pounds, and there was slight puffiness of her ankles. Only 10 gr. of quinine sulphate were used for the induction of labor. Later, 20 gr. of quinine hydrobromide were given as part of the Gwathmey mixture. Shortly after completion of the rectal analgesia she complained of marked tinnitus, nausea, and inability to see. Three hours later a dead fetus was delivered. The death of the infant was apparently due to strangulation by two loops of cord pulled tightly around the neck.

Eye examination at this time showed dilated, fixed pupils which gave no reaction to light. On pressure of the lids, there was a faint reaction of the seventh nerve. The fundi of both eyes showed well-outlined edges of the disc with constricted tortuous vessels, pallor, and a slight edema of the maculae. The fovea on the right was reported as appearing abnormally red. The ophthalmologist, Dr. Hans Barkan, made a diagnosis of toxic amblyopia and amaurosis due to quinine, allowing the possibility of a bilateral central retinal artery thrombosis. The day following delivery the patient recognized vague outlines of large objects. On the second day postpartum her pupils reacted to light, but the fundi showed little change. Her visual fields presented a markedly concentric contraction on rough examination. At the

time of dismissal eleven days later her sight had improved, but even five months later the Department of Ophthalmology reported that there still existed some pallor at the temporal side of the discs with residual relative scotoma.

This case is of interest because of the comparatively small dosage of quinine used. A large majority of cases of quinine amaurosis reported have resulted from large single doses or its continued use over a varying length of time. However, an occasional patient may react to an unusually small dosage, as did this one. Gooch²⁹ reports a case in which amaurosis followed the ingestion of 60 gr. in whisky for the purpose of abortion, while Plummer³⁰ reports blindness resulting from half that amount. Gustafson³¹ and White³² report single cases of quinine reaction following its administration rectally with the Gwathmey mixture, but in neither case was there any demonstrable visual disturbance.

COMMENT

Certain conditions other than those discussed may result in visual disturbances during pregnancy. Because of their comparative infrequency they are seldom encountered, even in a large clinic service. Erdheim and Stumm,³³ Mills,³⁴ and Wheeler³⁵ noted atrophy of the optic nerve and retinal changes similar to those seen in a true toxemia, attributed to pressure by an unusually enlarged hypophysis. Severe anemia during pregnancy of the puerperium may occasionally be the cause of amaurosis. Langdon³⁶ and Fink³⁷ both report cases following extensive hemorrhage. The eye findings were essentially negative except for the lack of pupillary response and extreme pallor of the fundi. According to Langdon,³⁶ permanent loss of vision may occur because of eventual atrophy of the optic nerve unless transfusion is employed. Fuchs²² calls attention to an occasional retrobulbar neuritis with amaurosis, resulting from the lowered resistance of the patient during the puerperium.

SUMMARY

With the exception of the first case presented, which was observed in the Stanford Obstetrical Service at the San Francisco Hospital, the cases discussed comprise the total number occurring in 3,355 clinic confinements during a period of ten years in the Lane Hospital service. As a group, they prove that:

1. Amaurosis is a comparatively rare complication of pregnancy.
2. The stress and strain of pregnancy and labor, with its various physiologic and metabolic changes, may be a factor in the causation of various visual disturbances.
3. When it does occur, amaurosis is associated with some form of toxemia in the majority of cases (5 of the 7 cases presented fall in this group).
4. An amaurosis occurring at any time during pregnancy, whether associated with pernicious vomiting or one of the late toxemias, is indicative of a serious condition and demands immediate termination of pregnancy.

5. There is a definite, though admittedly remote, danger to vision from the use of quinine in the pregnant patient.

REFERENCES

- (1) *Bergmann, M. B.*: Am. J. Ophth. 17: 141, 1934. (2) *Wagner, H. P.*: J. A. M. A. 103: 1910, 1934. (3) *Stander, H. J.*: Surg. Gynec. Obst. 54: 129, 1932. (4) *Tillman, A. J. B.*: AM. J. OBST. & GYNEC. 27: 240, 1934. (5) *Douglas, J. C., and Griffiths, W. R.*: M. J. Australia 1: 545, 1926. (6) *Schiötz, H.*: Klin. Monatsbl. f. Augenh. 67: 1, 1921. (7) *Swift, B. H., and Tostevin, A. L.*: M. J. Australia 1: 632, 1931. (8) *Bailliant, P., and Hartmann, E.*: (Quoted by Douglas, J. C., and Griffiths, W. R.), Ann. d'ocul. 164: 529, 1927. (9) *Stander, H. J., and Peckham, C. H.*: AM. J. OBST. & GYNEC. 11: 583, 1926. (10) *Corwin, Jean, and Herrick, W. W.*: AM. J. OBST. & GYNEC. 14: 783, 1927. (11) *Wolff and Zade*: (Quoted by Cheney, R. C.), Monatschr. f. Geburtsh. u. Gynäk. 40: 639, 1914. (12) *Cheney, R. C.*: J. A. M. A. 83: 1383, 1924. (13) *Volhard*: (Quoted by Cheney, R. C.), Verhandl. Heidelberg Ophth. Gesellsch., 1916. (14) *Mylius, K.*: Ztschr. f. Augenh. 77: 37, 1932. (15) *Fry, W. E.*: Arch. Ophth. 1: 609, 1929. (16) *Burnier*: (Quoted by Cheney, R. C.), Thèse de Paris, 1911. (17) *Silex, P.*: Berl. klin. Wehnschr. 32: 385, 1895. (18) *Black, N. M.*: Wisconsin M. J. 20: 181, 1921. (19) *Cumston, C. G.*: M. J. & Rec. 124: 420, 1926. (20) *Rochon-Duwignaud*: (Quoted by Cheney, R. C.), Soc. franç. d'ophth. cong., 1912. (21) *Graef, Charles*: Canad. M. A. J. 12: 481, 1922. (22) *Fuchs, E.*: (Quoted by Bergmann, M. B.) Textbook of Ophthalmology (Duane) ed. 8, 1924, J. B. Lippincott Co., p. 91. (23) *Dabney, S. G.*: Kentucky M. J. 20: 260, 1922. (24) *Jaffe, M.*: Arch. Ophth. 10: 754, 1933. (25) *Manes, A. J. O.*: (Quoted by Bergmann, M. B.), Arch. de oftal. de Buenos Aires 6: 359, 1931. (26) *Elliott, R. H.*: Am. J. Ophth. 1: 547, 1918; Brit. J. Ophth. 3: 8, 1919. (27) *Evans, J. N.*: Am. J. Ophth. 6: 271, 1923. (28) *Bollack, J.*: Médecine, Paris 5: 278, 1924. (29) *Gooch, H.*: Brit. M. J. 2: 115, 1926. (30) *Plummer, F. C.*: Brit. M. J. 2: 1062, 1925. (31) *Gustafson, G. W.*: AM. J. OBST. & GYNEC. 18: 877, 1929. (32) *White, C. E.*: J. Oklahoma M. A. 20: 174, 1927. (33) *Erdheim and Stumm*: (Quoted by Bergmann, M. B.), Beitr. z. path. Anat. u. z. allg. Path. 46: 132, 1909. (34) *Mills, L.*: AM. J. OBST. & GYNEC. 7: 304, 1924. (35) *Wheeler, J. M.*: M. J. & Rec. (supp.) 121: 355, 1925. (36) *Langdon, H. M.*: Arch. Ophth. 10: 99, 1933. (37) *Fink, K.*: Zentralbl. f. Gynäk. 48: 1188, 1924.

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Mathieu, Albert, and Palmer, Allen: The Early Diagnosis of Chorionepithelioma, Surg. Gynec. Obst. 61: 336, 1935.

The question of removal of the ovaries in conjunction with a hysterectomy for chorionepithelioma requires discussion. It is an acknowledged fact that in other forms of malignancy there will be less danger of recurrence if a thorough operation is done. However, it seems reasonable to believe that in cases of chorionepithelioma, diagnosed early, one need not remove the ovaries. In the first case, only a supravaginal hysterectomy was done, and there was no evidence of extension or recurrence or metastases. In the second case, a complete hysterectomy was done because of severe lacerations of the cervix, and the right ovary was removed only because it was firmly adherent to the posterior sheaf of the right broad ligament. The patients were both young women, and it hardly seemed reasonable to remove ovaries that had all the gross appearance of being normal. The results in the two cases seem to have justified the conservative procedure.

At present chorionepithelioma can be definitely diagnosed shortly after its inception. Every patient who passes a mole should have her urine examined for anterior pituitary-like hormone by the Friedman test monthly for at least a year. In this way a developing chorionepithelioma might be diagnosed early and removed before symptoms appear or metastases develop.

WM. C. HENSKE.

THE RELATION OF RETINAL CHANGES TO THE SEVERITY
OF THE ACUTE TOXIC HYPERTENSIVE SYNDROME
OF PREGNANCY*

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THE changes occurring in the retinas of women suffering from the acute toxic hypertensive syndrome of pregnancy have been noted by a number of observers. Schiötz, Cheney, Mylius, Friedenwald and others reported, in the course of toxemias of pregnancy, the identification of arteriosclerotic changes in the retina without evidence of pre-existing nephritis. Observing changes in the ocular fundus in "nephritis" of pregnancy, Behan advised study of the retinas of pregnant women. Wagener called attention to the appearance of varying degrees of spastic narrowing of the arterioles in the toxemias of the later months of pregnancy; these changes might or might not proceed to the stage of acute retinitis or to arteriosclerosis. He found that the acute vascular changes were sometimes superimposed on lesions characteristic of previous arteriosclerosis.

Before proceeding with the question of the relation of retinal changes to the degree of severity of the acute hypertensive toxemia of pregnancy, I wish to present evidence which indicates that the acute toxic hypertensive syndrome of pregnancy, commonly termed "preeclamptic toxemia," is a generalized disease affecting the arterioles and precapillary vessels throughout the body. Hinselmann, Linzemeier, Heynemann, Baer and Reis, and others noted, in preeclamptic toxemia, changes in the smaller vessels of the nail fold, consisting of alterations in the size of the arterioles, with evidence of spasm producing alternate regions of contraction and dilatation; furthermore, elongation of the capillary loops and more or less capillary stasis were seen. Hinselmann, Nettekoven and Silberbach found similar capillary changes in examination of a large majority of eclamptic patients. Kylin showed that these changes were identical with those in the capillaries of nonpregnant individuals suffering from acute glomerulonephritis. Keith, Barker, and Kernohan took for biopsy tissue from the pectoral muscles of nonpregnant patients who had vascular disease and glomerulonephritis; histologic studies of the walls of the arterioles disclosed changes parallel to those observed in examining the vessels of the nail fold. At or about the time of delivery in

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a small number of cases of preeclamptic toxemia, on the Obstetrical Service at the Mayo Clinic, small sections of muscle were obtained which disclosed alterations in the arterioles identical with those seen by Keith, Barker, and Kernohan.

Similar changes in glomerular capillaries in cases in which necropsy followed eclampsia have been observed by Fahr, by Schwarz and Dorsett and by Lubarsch and Lubarsch, who considered the glomerular changes in the light of a circulatory condition such as is found in glomerulonephritis of infectious origin; the glomerular capillaries have distorted and sometimes adherent loops, with poor cellular outlines and few nuclei. Using the azocarmine stain, Bell identified, in fatal cases of eclampsia and preeclampsia, a glomerular lesion which he described as characteristic of the hypertensive toxemia of pregnancy. He wrote, "the glomeruli are slightly enlarged and the lumina of their capillaries are narrowed and sometimes completely closed." The decrease in size of the lumen is caused chiefly by marked thickening of the capillary basement membrane. Bell did not agree that Volhard's theory concerning arteriolar spasm seems adequate to explain the thickening of the capillary walls, but suggested that the change was attributable to a soluble toxic substance in the blood.

Corwin and Herrick have stressed the etiologic relationship between toxemia of the later months of pregnancy and chronic cardiovascular and renal disease. More recently Herrick stated: "In extensive follow-up work from year to year the course and end of eclampsia, the nephroses and nephritides of pregnancy, unfold in the familiar forms of hypertensive cardiovascular disease or of true nephritis." He asserted that the thread of this primary vascular disease runs through most if not all of the toxemias of pregnancy that are not strictly in the nephritic group (that is, acute nephroses or preexisting nephritis). The occurrence of chronic nephritis after eclampsia has been noted by Caldwell and Lyle, by Gibson, by Harris, and by other observers. Peckham noted that the incidence of chronic nephritis following preeclamptic toxemia was influenced directly by the height of the blood pressure and the duration of the toxemia. In the series of cases which he reported, he noted that chronic nephritis did not develop subsequently among patients whose systolic blood pressure remained less than 170 mm. of mercury during the acute toxemia of pregnancy. When the blood pressure ranged between 170 and 200 mm., nephritis developed in 15 per cent of the cases, and when the pressure was more than 200, there was evidence of nephritis in 48 per cent.

It may be assumed, then, that in both the nonconvulsive and in the convulsive forms of the acute toxic hypertensive syndrome of pregnancy, there is a general systemic vascular change as revealed by study of the precapillary vessels of the nail fold, the renal glomerular tufts, and the retinal arterioles.

In the ophthalmoscopic examination of pregnant women, performed as a routine, Masters found that in every case in which the blood pressure of the patient was elevated to 150 mm. or more, there was narrowing of the caliber of the retinal arteries, and in a series of 44 cases of toxemia, this was observed in 3 cases in which the blood pressure was initially less than 150 mm., but subsequently rose much higher. In a series of 50 cases of acute toxemia in which hypertension had not existed previously, Wagener found that there were retinal changes in 70 per cent. His report included all cases in which the systolic blood pressure was more than 140 mm.

Wagener also stated that in cases of toxemia of pregnancy in which there is an associated rise in blood pressure, changes may be seen both in the retinal arterioles

and in the retina proper. The changes in the arterioles appear first and those in the retina proper, commonly called "retinitis," are secondary to, and apparently dependent on, the changes in the arterioles. The caliber of the arterioles appears narrowed and the lumen is reduced, because of spastic contraction and increased tonus of the walls of the arterioles. This change in the arterioles may disappear entirely if there is early and permanent fall in blood pressure. The constriction soon becomes fixed if the toxemia progresses. When the constriction of any arteriole becomes so fixed and severe as to cause secondary capillary ischemia or stasis, localized edema and hemorrhage appear in the adjacent retina. If the toxemia continues, this spastic constriction may become so generalized and severe as to produce diffuse retinitis of albuminuric type, the classic "retinitis of pregnancy nephritis." The presence or absence, or the advancement, of the involvement of the arterioles can be determined best by frequent systematic examinations of the retina.

Wagener's description of the retinal changes in cases of preeclamptic toxemia may be divided into four consecutive stages, dependent on the severity and duration of the hypertension accompanying the toxemia. (1) The first visible sign is spastic narrowing of the arterioles of the retina, which may affect all branches of the central artery. (2) Often there is irregular constriction of the lumens of the arterioles, usually first or more marked in the smaller nasal branches; this constriction may vary in degree or situation from day to day. (3) Later, as the narrowing and constriction become more fixed, individual cotton-wool patches and hemorrhagic areas may appear in the retina. (4) Diffuse retinitis of albuminuric type may develop.

Ophthalmoscopic examination of the retina was made in 108 cases, 98* cases in which there were no convulsions and in 10* cases in which there were convulsions associated with the acute toxic hypertensive syndrome of pregnancy, commonly called preeclamptic toxemia and eclampsia. During hospitalization of all patients but one, the systolic blood pressure was recorded at 140 mm. of mercury or more, and urinalysis revealed albumin Grade 2 or more. In one case the highest blood pressure was less than 140 mm. systolic. Judged by the highest systolic blood pressure, the patients were classified in groups similar to those used by Peckham in his study of nephritis following acute toxemia; namely, Group 1 included patients whose systolic blood pressure was between 140 and 169 mm. of mercury; Group 2, those whose systolic blood pressure was between 170 and 199 mm., and Group 3, those whose systolic blood pressure was higher than 200 mm. There is some evidence that the diastolic blood pressure is elevated out of proportion to the systolic pressure in the more severe degrees of toxemia, but the systolic reading is more commonly quoted and is therefore used in this study.

Of the 108 cases, in 14 the patients had preexisting hypertension; in Group 1, 6 patients had retinal changes Graded 1 and one had

*Some of these cases were previously reported by Wagener.

changes Graded 2; in Group 2, 3 patients had no retinal changes, 3 had changes Graded 1, and 1 had changes Graded 3; none were in Group 3.

Using the grading of 1 to 4, according to Wagener's description of the changes in the retinal arterioles and the retina proper in the toxemias of late pregnancy, the 108 cases just mentioned fell into the classification shown in Table I. Table I shows that the increase in the degree of the changes observed in the retinal arterioles appears to be in direct proportion to the height of the systolic pressure. In Group 1,

TABLE I. CHANGES IN RETINAL ARTERIOLES OF 108 PATIENTS, WHO HAD THE ACUTE TOXIC HYPERTENSIVE SYNDROME OF PREGNANCY, ACCORDING TO VARIOUS LEVELS OF SYSTOLIC BLOOD PRESSURE

CHANGES IN RETINAL ARTERIOLES, GRADE	HIGHEST SYSTOLIC BLOOD PRESSURE, MM. OF MERCURY					
	GROUP 1		GROUP 2		GROUP 3	
	140 TO 169		170 TO 199		200 OR MORE	
	CASES	PER CENT*	CASES	PER CENT	CASES	PER CENT
4	0		5	10	4	50.0
3	1	2	6	12	3	37.5
2	5	10	13	26	0	
1	20†	40	21	42	1	12.5
None	24	48	5	10	0	
Total	50		50		8	

*All percentages based on the total number of cases in each group.

†Acute retinal changes were present in one case in which the systolic blood pressure was less than 140 mm.

in 12 per cent of the cases the retinal changes were Graded 2 or 3, in none were Graded 4; in Group 2, 48 per cent were Graded 2, 3, or 4, and in Group 3, 87.5 per cent were Graded 3 and 4. Review of the hospital charts of these patients shows also that the severity of the changes demonstrated in the retina increased progressively with the duration of the hypertension. These findings, showing the relation of the changes in the arterioles of the retina to the height of the systolic blood pressure, run parallel to Peckham's study of the number of cases with a similar grouping relative to systolic blood pressure in which later chronic nephritis developed. The one patient, already mentioned, whose systolic pressure was not recorded as being as high as 140 is included to show that these spastic arteriolar changes may be evident when a comparatively small rise in blood pressure is present. If the concept of this condition as a spastic contraction of the intima of the arterioles or of the precapillary vessels throughout the body is correct, then there must be many cases in which the onset is insidious and in which at first there are minor deviations from the normal; these may subside or may increase progressively; in some cases the onset may be abrupt and the progress rapid. I believe, as Wagener stated, that the variability of the narrowings and their usual tendency to disappear rapidly after the termination of toxemia, sug-

gest that they are visible signs of functional or angiospastic lesions rather than of arteriosclerosis. If the spastic constriction is more marked and is maintained over a significant period of time, actual organic changes are prone to occur.

A tabulation of the retinal examinations was made, also, for each rise of ten points in systolic pressure (Table II). Table II and Fig. 1 show more clearly than does Table I the progressive increase in number of patients who had the more marked changes in the arterioles and the higher systolic pressures. Four patients whose systolic blood pressure did not rise higher than 149 mm. of mercury and ten other patients who had blood pressure remaining less than 160 gave evidence of spastic constriction of the retinal arterioles. This is evidence

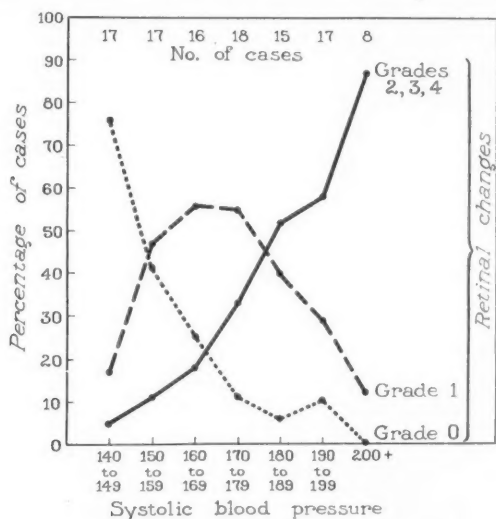


Fig. 1.—The percentage of cases arranged according to grading of retinal changes for each ten point rise in systolic blood pressure.

that a generalized vascular disturbance rather than a local condition, such as lowered renal function, is present in association with the mild as well as with the more severe forms of preeclamptic toxemia. It is of interest to note that in cases in which the systolic blood pressure was less than 180, no changes of acute retinitis Grade 4 developed. When the vascular lesion in the retina is marked and severe, it may be assumed that a similar lesion is present in the systemic arterioles. If the injury progresses to such a degree that the narrowing of the precapillary vessels may be associated with sufficient intimal thickening to close the lumen and cause local necrosis and hemorrhage, it is conceivable that vessels throughout the body are involved, and that those in one part of the body may be affected more than those in another part. In addition to the common occurrence of retention of

tissue fluids in cases of eclampsia that come to necropsy, injury to the precapillary vessels has been found in the brain, heart muscle, lungs and renal glomeruli, and it is possible that the periportal thrombosis in the liver is attributable to the pressure of hemorrhage from injured arterioles. If patients recover, the injury to the liver may pass unnoticed because of the wide margin of safety which must be overcome before hepatic insufficiency becomes manifest, and also because of the ability of the liver to regenerate. Injury of similar degree, or even of lesser degree may affect so seriously the systemic precapillary vessels, and particularly those in the glomerular tufts, that complete recovery does not occur.

TABLE II. CHANGES IN RETINAL ARTERIOLES ACCORDING TO EACH RISE OF TEN POINTS IN SYSTOLIC BLOOD PRESSURE OF 108 PATIENTS WHO HAD THE ACUTE, TOXIC HYPERTENSIVE SYNDROME OF PREGNANCY

CHANGES IN RETINAL ARTERIOLES, GRADE	SYSTOLIC BLOOD PRESSURE, MM. OF MERCURY						
	140 TO 149	150 TO 159	160 TO 169	170 TO 179	180 TO 189	190 TO 199	200+
	CASES	CASES	CASES	CASES	CASES	CASES	CASES
4	0	0	0	0	3	2	4
3	0	0	1	2	1	3	3
2	1	2	2	4	4	5	0
1	3	8	9	10	6	5	1
0	13	7	4	2	1	2	0
Total cases	17	17	16	18	15	17	8

In accord with the observations previously reported by others, one patient whose recorded systolic blood pressure did not reach 150 mm. of mercury had eclamptic convulsions; there were no demonstrable retinal changes. Another patient whose pressure was less than 160 mm. of mercury and in examination of whom retinal changes Grade 1 were found had convulsions. The ten eclamptic patients, as a group, did not reveal as marked retinal changes as some of the patients who had a more protracted disturbance and sometimes no higher blood pressure. These observations are in line with the report by Caldwell and Lyle of an 8 per cent incidence of chronic nephritis after eclampsia, a decidedly lower incidence than Peckham reported after severe and often more prolonged nonconvulsive toxemia. The retinal changes in the ten eclamptic patients showed (Table III) the same trend toward more severe retinal changes among the patients who had higher systolic pressure. It was not always possible to obtain satisfactory examination of the retinas in cases of eclampsia, and some results, therefore, are not included in this study.

In Table IV may be noted reports of cases of preeclamptic toxemia in which labor was induced. The decision to induce labor rested on the severity of the symptoms, the height of the blood pressure and

the degree of change observed in the retina. This table indicates definitely that the percentage of cases in which labor was induced increased progressively with the height of the blood pressure and with the degree of change noted in the arterioles of the retinas. In a number of cases, spontaneous onset of labor rendered induction unnecessary.

TABLE III. CHANGES IN RETINAL ARTERIOLES ACCORDING TO SYSTOLIC BLOOD PRESSURE IN TEN CASES OF ECLAMPSIA WITH CONVULSIONS

CHANGES IN RETINAL ARTERIOLES, GRADE	SYSTOLIC BLOOD PRESSURE, MM. OF MERCURY						
	140 TO 149	150 TO 159	160 TO 169	170 TO 179	180 TO 189	190 TO 199	200+
4	0	0	0	0	2	0	0
3	0	0	0	1	0	0	0
2	0	0	0	1	1	0	0
1	0	1	0	0	0	1	0
0	1	0	1	0	0	1	0
Total cases	1	1	1	2	3	2	0

TABLE IV. CHANGES IN RETINAL ARTERIOLES ACCORDING TO SYSTOLIC BLOOD PRESSURE IN FORTY-SEVEN CASES IN WHICH LABOR WAS INDUCED

CHANGES IN RETINAL ARTERIOLES, GRADE	SYSTOLIC BLOOD PRESSURE, MM. OF MERCURY						
	140 TO 149	150 TO 159	160 TO 169	170 TO 179	180 TO 189	190 TO 199	200+
4	0	0	0	0	2	2	4
3	0	0	1	2	1	3	2
2	0	1	1	1	3	3	0
1	1	2	2	4	3	3	1
0	2	1	1	1	0	0	0
Percentage in each blood pressure group in which labor was induced	11.1 of 17	23.5 of 17	31.3 of 16	44.4 of 18	60 of 15	64.7 of 17	87.5 of 8

COMMENT

The acute toxic vascular syndrome of pregnancy, commonly known as preeclamptic toxemia, occurs with comparative frequency. Evidence obtained from examination of the nail folds, ocular fundi and specimens of muscle taken for biopsy, and from examination at necropsy of various organs, including the kidneys, liver, brain and heart muscle, indicates that there is widespread injury to the smaller arterioles and capillaries which may progress to permanent injury if the spastic state of the intima of these small vessels is maintained for a more or less prolonged period. Many patients who recover from the more prolonged and severe hypertensive forms of toxemia suffer permanent injury to the general vascular system or renal glomeruli, or both.

If the toxemia is either mild or, although more severe, is not prolonged, most patients improve promptly after termination of preg-

nancy and tend to recover completely. In addition to readings of the blood pressure, urinalysis and evaluation of the symptoms, changes observed in the arterioles of the retina furnish a valuable index of the degree of injury to the general vascular system and to the rate at which this injury may be progressing. In a number of cases the change in the retina is the deciding factor in determining if, and when, to terminate pregnancy. In the face of high or rising blood pressure, ophthalmoscopic examination of the retinas should be made at fairly frequent intervals, sometimes daily, even though subjective disturbances of vision are absent. The patients whose retinal changes do not proceed beyond Groups 1 or 2 rarely undergo permanent injury of the vascular system or kidneys. Some of those in Group 3 and practically all in Group 4 who reveal evidence of diffuse retinitis suffer permanent vascular or renal injury, or both.

SUMMARY AND CONCLUSIONS

Ophthalmoscopic examination was made of the retinas of 108 patients who had acute toxic vascular (hypertensive) syndrome of pregnancy. In 72 per cent of cases in which the systolic blood pressure was 140 mm. of mercury or more, positive evidence was found of more or less change in the retinal arterioles or in the retina proper. As a rule, changes in the retina, which at first consisted of spastic narrowing of the retinal arterioles, revealed a definite increase in degree and severity, with increase in the height of the systolic blood pressure and the duration of the toxemia. Information obtained by retinal examination of patients who have acute hypertensive toxemia of pregnancy is a distinct aid to the obstetrician in determining if, and when, pregnancy should be terminated. It seems evident that when the spastic condition of the retinal arterioles is maintained, the first appearance of cotton-wool exudates and hemorrhages in the retina indicates the danger of permanent systemic arteriolar injury; in the presence of such retinal changes, pregnancy should be terminated promptly.

REFERENCES

- (1) Baer, J. L., and Reis, R. A.: J. A. M. A. 82: 526, 1924. (2) Behan, J. L.: Tr. Sect. Ophth. Am. Med. Assn. p. 44, 1922. (3) Bell, E. T.: Am. J. Path. 8: 1, 1932. (4) Caldwell, W. E., and Lyle, W. G.: AM. J. OBST. & GYNEC. 2: 17, 1921. (5) Cheney, R. C.: J. A. M. A. 83: 1383, 1924. (6) Corwin, Jean, and Herrick, W. W.: AM. J. OBST. & GYNEC. 14: 783, 1927. (7) Fahr, T.: Schwangerschaftsnephrose. Eklampsieniere. In: Heinke, F., and Lubarsch, O.: Handbuch der speziellen pathologischen Anatomie und Histologie, Berlin, 1925, Julius Springer 6: Part 1, pp. 254-256. (8) Friedenwald, J. S.: The pathogenesis of albuminuric retinitis. New York, Libman Anniversary Volumes, New York International Press, 2: 453, 1932. (9) Gibson, H. K.: Surg. Gynec. Obst. 32: 513, 1921. (10) Harris, J. W.: Bull. Johns Hopkins Hosp. 35: 103, 1924. (11) Herrick, W. W.: J. A. M. A. 103: 1902, 1934. (12) Heynemann, T.: Zentralbl. f. d. ges. Gynäk. u. Geburtsh. 44:

- 449, 1920. (13) *Hinselmann, Hans*: Zentralbl. f. d. ges. Gynäk. u. Geburtsh. 44: 987, 1920. (14) *Hinselmann, Hans, Nettekoven, Hans, and Silberbach, Walter*: Arch. f. Gynäk. 116: 443, 1923. Abst. in: J. A. M. A. 80: 1108, 1923. (15) *Keith, N. M., Barker, N. W., and Kernohan, J. W.*: Abst. in: Tr. Assn. Am. Phys. 46: 66, 1931. (16) *Kylin, Eskil*: Acta gynecol. Scandinav. 2: 501, 1924. (17) *Linzemeier, G.*: Zentralbl. f. d. ges. Gynäk. u. Geburtsh. 46: 1010, 1922. (18) *Lubarsch, O.*: Die Nierengewächse. In: Henke, F., and Lubarsch, O.: Handbuch der speziellen pathologischen Anatomie und Histologie, Berlin, 1925, Julius Springer 6: Part 1, pp. 581-717. (19) *Masters, R. J.*: Tr. Am. Ophth. Soc. 31: 416, 1933. (20) *Mylius, Karl*: Funktionelle Veränderungen am Gefäßsystem der Netzhaut, Berlin, 1928, S. Karger, 82 pp. (21) *Peckham, C. H.*: Bull. Johns Hopkins Hosp. 45: 176, 1929. (22) *Schiötz, Hjalmar*: Klin. Monatsbl. f. Augenh. 67: 1, 1921 (Suppl.). (23) *Schwarz, O. H., and Dorsett, E. L.*: South. M. J. 23: 288, 1930. (24) *Volhard, F.*: Die doppelseitigen hematogen en Nierenerkrankungen. In: von Bergmann, Gustav und Staehelin, R.: Handbuch der inneren Medizin, Berlin, 1931, Julius Springer, ed. 2, 6: Part 1, p. 333, Zentralbl. f. d. ges. Ophth. u. Grenzgeb. 21: 129, 1929. (25) *Wagener, H. P.*: J. A. M. A. 101: 1380, 1933.

FURTHER END-RESULTS IN THE TREATMENT OF CARCINOMA OF THE CERVIX*

INCLUDING THE REPORT OF A SECOND FIVE-YEAR SERIES

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FIVE years ago the authors published the end-results obtained in the treatment of carcinoma of the uterine cervix observed on the Gynecologic Ward Service of Dr. Brooke M. Anspach, Jefferson Medical College Hospital.¹ The group studied at that time consisted of 63 patients seen between Sept. 1, 1921, and Sept. 1, 1925, of whom 57 received treatment, 4 by combined surgery and radiation and 53 by radiation alone.

Considering 3 untraced patients as dead (a complete follow-up of 95.2 per cent), the absolute curability (based on the number seen) was 14.2 per cent, while the relative figure (based on patients actually treated) was 15.7 per cent. Considering radiation only, the absolute curability was 13.5 per cent and the relative, 15.0 per cent. Only one of the 4 patients treated by combined surgery and radiation survived the five-year period, while 8 patients treated solely by radiation were alive and well five or more years after treatment. In addition 3 patients lived six to seven years after radiation therapy, but died of recurrent carcinoma. Regarding these patients as cured of the disease for five years or more increased what we may term the five-year salvage, to 18.6 per cent absolute and to 20.7 per cent relative respectively.

*Read at a meeting of the Obstetrical Society of Philadelphia, December 5, 1935.

The purpose of this report is to include an analysis of 93 additional patients observed over a second five-year period, from Sept. 1, 1925, to Sept. 1, 1930, thus providing a total study of 156 patients encountered from 1921 to 1930, of whom 146 were treated. With but 6 patients untraced, and therefore considered as dead, a follow-up of 96.1 per cent of patients seen, and of 97.9 per cent of patients actually treated is presented. Of the 10 untreated patients, 2 refused treatment while in the remainder the disease was considered too far advanced for any therapy (Table I).

Furthermore, the study attempts to evaluate, to a certain extent at least, the general plan of treatment employed during that period, for in 1927 a change in the technic of application of deep x-ray therapy was effected, and more recently our conception of its utilization has varied. For these reasons we believe that this analysis will form a valuable basis for comparative study when the results of treatment observed since 1930 are presented in future reports.

TABLE I. PATIENTS OBSERVED, FOLLOW-UP

		FOLLOW-UP	PER CENT
Patients seen	156	150	96.1
Patients treated	146	143	97.9

TABLE II. EXTENT OF INVOLVEMENT (SCHMITZ)

Class 1	2	11.5 per cent
Class 2	16	
Class 3	114	88.5 per cent
Class 4	19	
Class 5	5	

CLASSIFICATION OF EXTENT OF DISEASE

We continue to employ Schmitz's classification in estimating the extent of involvement. The previous report was based on this grouping and subsequent case recording has been in conformity with it. For that reason, and because we believe the Schmitz plan to be the simplest, we have hesitated to regroup our cases according to the more complicated League of Nations classification as has been suggested by the American College of Surgeons; in this we agree with the recently expressed opinion of Ward and Sackett.² Furthermore, it is impractical to expect that an attempted review of the records of all patients observed since 1921, would result in an accurate League of Nations classification that would be sufficiently trustworthy.

Table II depicts the extent of involvement. Eighteen patients were in Classes 1 and 2 (11.5 per cent); 138 patients in Classes 3, 4, and 5 (88.5 per cent).

AGE INCIDENCE, PARITY, RACE

Table III shows the age incidence of the group. Attention should be called to the fact that nearly 30 per cent of the patients were under the age of forty and that comparatively few patients over sixty years

TABLE III. AGE INCIDENCE, PARITY, RACE

DECADE	NUMBER	PER CENT
20-29	6	3.8
30-39	40	25.6
40-49	44	28.2
50-59	45	28.9
60-69	19	12.1
70-79	2	1.3
Youngest, 22; oldest, 79		
29.4 per cent under age of 40		
Nulliparas, 9, 5.7 per cent		
Negroes, 21, 13.4 per cent		

of age were observed. The youngest patient in the series was twenty-two; the oldest, seventy-nine. Nine patients were nulliparous (5.7 per cent); 21 were negroes (13.4 per cent).

RESULTS OF TREATMENT

In evaluating the results obtained in the treatment of cancer of the cervix, it has been generally accepted that a patient may be regarded as cured who is alive and free from evidence of the disease five years after treatment. That this criterion should be accepted as the standard of curability is open to criticism because:

1. There may be recurrence of the growth after the so-called five-year period has elapsed, a not infrequent observation.
2. Reradiation of recurrent carcinomatous areas may have prolonged the period of survival to five years and even longer, as noted in our experience.
3. Misunderstanding as to the employment of the term "five-year cure," in statistical reviews. Does the expression invariably refer to patients actually living and free from evidence of carcinoma for five years or longer after treatment, or does the term merely imply survival for five years or longer with death occurring from recurrent cancer at some time after such a period of salvage has elapsed?

It seems proper that the curability expressed in percentage, to be of value for comparative study, should be based upon the number of patients alive and free from carcinoma for five or more years when the report is made, and upon the number of patients seen during the period included, whether treated or not, the figure of absolute curability. Our experience leads us to believe that an eight-year limit of freedom from cancer recurrence after treatment would be a more secure criterion of cure than the five-year limit, and we suggest that the latter term be qualified by the use of the expression, "five-year

salvage." Deaths after the five-year period has elapsed should be regarded as due to recurrent carcinoma unless the contrary is proved.

To illustrate this point, Table IV depicts for comparative study the absolute and relative curability and the five-year salvage secured in the present series together with the primary mortality. An absolute curability of 19.2 per cent is presented, which contrasts favorably

TABLE IV. RESULT OF TREATMENT, ALL CLASSES

Of 156 patients observed, 30 are alive from 5 to 12 years	19.2	per cent (Absolute)
Of 146 patients treated, 30 are alive from 5 to 12 years	20.5	per cent (Relative)
7 additional patients survived from 6 to 8 years after treatment, establishing a 5-year salvage of	25.3	per cent (Relative)
Primary mortality	0.068	per cent

with the 14.2 per cent exhibited in our first five-year series. The relative curability of 20.5 per cent shows equal improvement over the former figure of 15.7 per cent, while the five-year salvage of 20.7 per cent formerly established now appears as 25.3 per cent. There was one primary mortality, 0.068 per cent.

We have seen fit to include in the absolute and relative curability figures (present-day survival):

1. A patient having panhysterectomy in 1921, with radiation treatment for vaginal vault recurrence four years later, who now represents a ten-year survival period since the radium application.

2. Three reradiated patients, under the following circumstances:

One patient, treated early in the series when frequent reradiation was not uncommon, received 3,600 mg. hr. in December, 1922, and 1,200 mg. hr. in February, 1923 with adjuvant x-ray therapy. This subsequent radiation was not for recurrence, but was applied as a part of the technic.

A second patient received an initial dosage of 2,400 mg. hr. in October, 1926; in July, 1932, an area suspicious of recurrence was biopsied, found to be cancerous, and reradiated (1,200 mg. hr.), with x-ray therapy immediately following. For this reason, some might with justification dispute our judgment in classifying this patient as a five-year cure.

The third patient, treated in November, 1927 with 4,800 mg. hr. likewise exhibited a suspicious area which was treated with 600 mg. hr. in February, 1934, the biopsy failing to substantiate our impression of recurrent carcinoma.

"EARLY" CASES

In Table V is seen the result obtained in the treatment of the so-called "early" cases (Classes 1 and 2). Eighteen patients were seen and treated, 7 of whom are alive, 38.8 per cent. Three additional patients survived six to eight years after treatment, 2 dying of recurrent cancer, 1 being untraced, five-year salvage of 55.5 per cent. In

the large group of advanced cases (Classes 3, 4, and 5), the absolute curability rate is 16.6 per cent; the five-year salvage was 19.5 per cent. The improved prognosis following treatment of the "early" case is well illustrated.

TABLE V. RESULT OF TREATMENT, CLASSES 1 AND 2

Of 18 patients observed and treated, 7 are alive from 5 to 12 years	38.8 per cent
3 additional patients survived from 6 to 8 years after treatment, establishing a 5-year salvage of	55.5 per cent

CARCINOMA OF CERVICAL STUMP

Our experience with carcinoma of the cervical stump is embodied in a contribution now in course of preparation, which will include an analysis of such cases as we have seen to date and which will deal with the various phases of this complex problem. In the group of 156 patients herewith presented, the condition was met with 7 times, an incidence of 4.5 per cent. All were well-advanced cases (Class 3). Three are alive and well, seven years after treatment (42.8 per cent). One lived six years after treatment, increasing the five-year salvage to 57.1 per cent. Three died within a year of treatment. Radium therapy was employed in each case, supplemented by x-ray radiation in three instances, one of which includes a patient now living (Table VI).

TABLE VI. CARCINOMA OF CERVICAL STUMP

Patients seen	156
Carcinoma cervical stump	7
Incidence	4.5 per cent
Present-day survival	3
Survived 6 years	1
Died within one year of treatment	3
Absolute salvage	42.8 per cent
5-year salvage	57.1 per cent

HISTOLOGIC GRADING

In our previous communication, we expressed the view, in conformity with the opinion of Dr. Baxter L. Crawford, pathologist to the Jefferson Hospital, that the histologic grading of tumors as to the degree of malignancy is of importance in prognosis and sensitivity to radiation, only if closely correlated with the history, gross character and clinical interpretation of the lesion. At that time we stated our preference for a simplified histologic classification, designating the degrees of malignancy as low-grade, intermediate, or high-grade in type. The first implies cornification, pearl formation, the presence of prickle cells and intercellular fibrils; the second shows large polyhedral cells

of alveolar distribution, often exhibiting a marked polymorphism; the third type is definitely anaplastic, the cells being smaller, more closely packed together, with polyhedral or spindle forms.

Since several of these characteristics may sometimes be found in the same block of tissue when cut at different levels, it is necessary to group the lesion according to its predominant features. For this reason, it seems to us, as recently emphasized by Chambers,³ that sole dependence upon histologic grading as the determining factor of radiosensitivity and prognosis will not infrequently lead to disappointment. Generally, the low-grade type of malignancy is considered to be the most radioresistant, and the high-grade type to be comparatively radiosensitive. The group showing an intermediate type of malignancy, often partaking of the characteristics of one or both of the other groups, may likewise be either resistant or sensitive to radiation, since the radiosensitivity of squamous cell cancer is relative.

Of the group of 37 patients who are living or who survived for five or more years, the majority 19 (51.3 per cent) were in the intermediate group; 5 (13.5 per cent) presented evidence of high-grade (anaplastic) malignancy, while a similar number exhibited the low-grade (adult) type. Two (5.4 per cent) were grouped as adenocarcinoma, while in 6 instances (16.2 per cent) the slides were not available for review (Table VII).

TABLE VII. HISTOLOGIC GRADES OF MALIGNANCY

GRADE	PATIENTS	PER CENT
Intermediate	19	51.3
High	5	13.5
Low	5	13.5
Adenocarcinoma	2	5.4
Unavailable for review	6	16.2

A comprehensive survey, reviewing all cases observed in the clinic, is contemplated as the basis for an independent study to be reported at a later date.

SURGERY AND RADIATION

No patient in the group presented was treated by panhysterectomy only. From 1921 to 1923, 4 patients were subjected to the complete operation, of whom 3 received preliminary radium treatment. Two died in one and one-half years; one was radiated for recurrence six years after operation, surviving a year longer. As previously mentioned, one patient, operated upon in 1921, received radium for recurrence four years later, followed by deep x-ray therapy, and is alive and well. Two additional patients, having complete hysterectomies elsewhere, were treated by us with radium for recurrence, succumbing within a year (Table VIII).

TABLE VIII. TREATMENT, SURGERY AND RADIATION, 6 PATIENTS

Complete hysterectomy, preceded by radiation (2 died in 1½ years; 1 survived 6 years—Recurrence radium and x-ray therapy; death 1 year later)	3
Complete hysterectomy, followed by radiation (1 alive and well; operation, 1921; recurrence, 1925; radium and x-ray therapy. 2 dead; operation elsewhere; recurrence, radiation, and death in 1 year)	3

RADIATION THERAPY

One hundred and forty patients were treated solely by radiation therapy, 114 (81.4 per cent) by radium alone. Subsequent x-ray therapy was employed in 22 (15.7 per cent), while 4 patients (2.8 per cent) received x-ray therapy only. The technic of the radium application in this group, sometimes spoken of as the concentrated treatment method, has been practically uniform throughout with the exception of the milligram hour dosage. Fifty milligrams of radium sulphate, sealed in glass within a silver capsule of 0.3 mm. thickness, enclosed in turn by a brass capsule of 1.0 mm. thickness, further screened with black rubber tubing 2.0 mm. in thickness, has generally been placed in the cervical canal or its craterlike remnant. About the periphery of the growth have been placed needles, 6 to 8 in number, containing 12.5 mg. of radium screened by 0.3 mm. of Monel metal. Particular attention has always been paid to the protection of the bladder, rectum, and uninvolved vaginal walls by the liberal use of gauze packing together with a self-retaining bladder catheter in situ (Table IX).

TABLE IX. RADIATION THERAPY, 140 PATIENTS

RADIATION	PATIENTS	PER CENT
Radium only	114	81.4
Radium plus x-ray	22	15.7
X-ray only	4	2.8
Reradiations	23	16.4
Of 29 living patients, 6 (20.7 per cent) received subsequent x-ray therapy; 3 (10.3 per cent) were also reradiated.		
Of 111 patients now dead, 16 (14.4 per cent) received subsequent x-ray therapy; 20 (18.0 per cent) were also reradiated.		

It is interesting to note the variation in the initial doses of radium employed (Table X). From an early average of 2,026 mg. hr., there was a very definite increase until a peak of 4,362 mg. hr. was attained. The severity of reactions influenced the subsequent reduction to an average dosage of 3,600 mg. hr. which is the amount that has generally been employed since 1928-29, and is the customary dosage at present. Recently a capsule screened with 0.5 mm. of platinum has been made available for our use.

Twenty-three patients (16.4 per cent) have been reradiated. Reradiations, often multiple and in the absence of recurrence, were employed not infrequently from 1921 to 1923. Since that time our attitude has been to reradiate only in the presence of local recurrence, as advocated by Ward. As stated before, 3 of the 29 living patients, treated primarily with radium, have been reradiated (10.3 per cent), while 20 patients out of 111 now dead were reradiated, of whom only one survived the five-year salvage period.

Cautery amputation, associated with the radium application, has seldom been employed.

It has been mentioned that one purpose of this report was to present a series of patients, the result of whose treatment might be of comparative value later on because of a definitely changed x-ray technic. Adjuvant x-ray therapy was employed in 15.7 per cent of the patients

TABLE X. AVERAGE INITIAL DOSAGE WITH RADIUM

YEAR	MG. HR. RADIUM	PATIENTS	5-YEAR SALVAGE	NOW LIVING
1921-22	2026	23	3	0
1922-23	2147	19	4	2
1923-24	2200	6	1	1
1924-25	2981	11	6	5
1925-26	3110	10	2	2
1926-27	3053	14	4	3
1927-28	4362	22	8	8
1928-29	3690	20	6	6
1929-30	3576	17	3	3
Influence of reradiations (10.3 per cent), subsequent x-ray therapy (20.7 per cent), and panhysterectomy followed by radiation (1 case) must be evaluated in the living patients.				

treated with radium prior to Sept. 1, 1930, and in each instance its use was subsequent to, and never preliminary to the radium application. There was no uniformity as to the time of its employment. In only one case was it used simultaneously with the radium application, rarely if ever as soon as six to eight weeks afterward, and usually only when a definite recurrence had been reradiated or gross extension had occurred. The x-ray therapy has been and is carried out in the Department of Roentgenology at Jefferson Hospital under the direct supervision of Drs. W. F. Manges, J. T. Farrell, Jr., and Manges Smith whose cooperation has been earnestly sought and generously given.

Prior to August, 1927, "massive doses were given in a single sitting at right angles to one of 3 or 4 pelvic ports. The amount given was that which the skin would tolerate, and the entire course was completed in three or four days. The factors were 3 milliamperes at 170 to 200 kilovolts, filtered through 0.5 mm. of copper and 1.0 mm. of aluminum at 50 cm. skin-target distance, through ports 16, 19, or 20

cm. square."⁴ The dosage delivered through each port varied from 800 r. to 2,140 r. Three patients received 1 course, 1 received 2 courses, and 1 reached 3 courses.

Since that time the saturation method of Pfahler has been followed. This aims to give a maximum amount of radiation to the tumor without damaging the normal structures. Treatment is directed through 4 ports, 2 anterior and 2 posterior; the size of the ports varies with the size of the patient; in small individuals, ports 16 cm. square are sufficient; in large individuals, ports 20 cm. square are employed. The patient is measured with calipers and a cross-section diagram made of the pelvis on tracing paper. The depth dose is determined by the use of the isodose curves of Weatherwax. The object is to deliver 100 per cent of the skin erythema dose into the depths of the pelvis in two weeks, by giving treatment on alternate days until the saturation level is reached. Treatment is then continued two more weeks, keeping the depth dose at 100 per cent by giving enough treatment to make up the loss sustained in the intervals between treatment.

The factors used in the treatment are 200 kilovolts, 50 cm. distance filtered through 0.5 mm. of copper and 1.0 mm. of aluminum. The output on one machine is 18.5 r. per minute when 8 milliamperes are used, and the erythema is estimated at 800 r. The dosage delivered through each port by this method varied from 1,400 to 2,500 r., the majority of the patients receiving one course of treatment, some of which has been subsequent to 1930.

Because of the use of this improved technic and because recently, as advocated by Healy,⁵ we have been preceding radium therapy more and more with preliminary x-ray treatment, and employing it more promptly after treatment with radium, we are of the opinion that the result of this altered plan of treatment will be reflected in the follow-up study of the patients treated since 1930 and will thus form an advantageous basis for a comparative study with the results obtained in the series herewith presented.

COMMENT

Analysis of the combined group of patients observed and treated between 1921 and 1930 shows an improvement of 5 per cent in the absolute and relative curability and in the five-year salvage, when compared with the report presented five years ago. To what is this gain due? Patients have not been observed in an earlier stage of the disease, as the ratio of early to late cases is approximately the same. We attribute the statistical betterment to the following factors:

1. Increased milligram hours of radium dosage, eventually attaining an optimum average of 3,600 mg. hr.
2. Improved technic of application, the result of continued experience.

3. Constant improvement in the management of the follow-up clinic, under the personal supervision of those actually treating the patients. Punctual attendance at a weekly clinic and persistent effort to maintain contact with the patient through an appointment system is insisted upon. The cooperation of the family physician and the patient's relatives is encouraged. These procedures are enhanced by correspondence, and personal visits by the social worker. We feel that these methods are not only responsible for the small percentage of untraced patients in this series but that they have also afforded the opportunity of increasing the salvage period by prompt reradiation and adjuvant x-ray therapy in several instances.

Since this presentation is almost exclusively a summary of the results and technic of the treatment of cervical cancer, it is neither our purpose, nor will space permit of a further discussion of the interesting individual problems frequently encountered. The discussion of etiology, prophylaxis, early diagnosis, complications and items of peculiar interest must of necessity be presented in separate contributions. Attention has been called to this aspect of the cancer problem in a recent contribution.⁶

SUMMARY

An analysis of a series of 156 patients with carcinoma of the cervix observed on the Gynecologic Ward Service, Jefferson Medical College Hospital, between 1921 and 1930, of whom 146 were treated, is presented, based upon a follow-up of 96.1 per cent of the patients seen, and of 97.9 per cent of the patients treated.

An absolute curability rate of 19.2 per cent, and a relative curability rate of 20.5 per cent, and a five-year salvage of 25.3 per cent are presented. These are contrasted with the rates of 14.2 per cent, 15.0 per cent, and 20.7 per cent respectively, reported by the same authors five years ago, based upon the study of 63 patients observed between 1921 and 1925.

Various phases of the analysis are discussed in detail, together with the exhibition of statistical tables.

REFERENCES

- (1) Scheffey, L. C., and Thudium, W. J.: AM. J. OBST. & GYNEC. 22: 247, 1931.
- (2) Ward, G. G., and Sackett, N. B.: Surg. Gynec. Obst. 60: 495, 1935. (3) Chambers, H.: Am. J. Cancer 23: 1, 1935. (4) Montgomery, J. B., and Farrell, J. T., Jr.: AM. J. OBST. & GYNEC. 28: 365, 1934. (5) Healy, W. P.: AM. J. OBST. & GYNEC. 30: 613, 1935. (6) Scheffey, L. C.: AM. J. OBST. & GYNEC. 28: 214, 1934.

255 S. 17TH STREET

N. W. COR. 16TH AND WALNUT STREETS

DISCUSSION

DR. ROBERT A. KIMBROUGH, JR.—I agree that Dr. Scheffey is probably correct in ascribing a large portion of a 5 per cent increase in salvage to a more careful follow-up system. His results are in conformity with the oft repeated state-

ment that whether carcinoma of the cervix be treated by operation or by irradiation, the salvage is about 20 per cent in recognized clinics.

Our results will show no material improvement until we obtain a satisfactory method of delivering a larger amount of radiation to the parametrial tissues. At the University Hospital, we increased our radium dosage two years ago to an average of 5,000 mg. hr. and have followed this with two x-ray cycles of 1,600 r. to each of four fields.

We feel that x-ray therapy is undoubtedly of palliative value, but whether it will increase the total salvage remains to be seen. Our impression is that the results are somewhat better, although sufficient time has not elapsed for a statistical study. We doubt however the wisdom of the administration of heavy dosage of x-ray to the patient with far-advanced cancer in whom there is little or no chance of cure.

DR. BAXTER L. CRAWFORD.—In carcinoma of the cervix, the prognosis based upon the microscopic grading of the tumor alone is probably of little value. When however the grade of malignancy of the tumor is considered with other points, such as the size and duration of the lesion and the age of the patient, we consider that it is of distinct value. The degree of malignancy also seems to have a relationship to metastasis, for tumors of high malignancy are more likely to metastasize earlier than those of low malignancy.

DR. STEPHEN E. TRACY.—I do not believe in the treatment of carcinoma by a predetermined number of milligram hours of radium. At the Oncologic Hospital we treat malignancies according to tissue and constitutional tolerance. Patients with carcinoma of the cervix are treated locally with radium up to the limit of tissue tolerance. This is followed by the limit of deep x-ray treatment. The dosage varies from a few hundred to several thousand milligram hours of radium. To illustrate this point I shall cite one case:

A patient with a Group III cancer of the cervix had been given 7,400 mg. hr., of radium locally which had been followed by 11,600 r. units. The tissues healed and all evidence of the malignancy disappeared until two years later. At that time there was noted a hard mass, 5 cm., in diameter, situated in the left side of the pelvis between the rectum and the pelvic bone. As x-ray had accomplished but little in similar cases, it was decided to treat her with a 4 gm. radium bomb. Over a period of seventeen days she was given 232,000 mg. hr., of radium filtered with 0.05 platinum, 3 of lead at 15 cm. distance. Three weeks later the mass was soft and about one-third its former size. This patient was seen a few weeks ago, about a year after the treatment, and at that time the mass had entirely disappeared.

DR. SCHEFFEY (closing).—As to the use of the term "five-year salvage," I agree with Dr. Kimbrough that we should not regard "five-year salvage" as a cure. We must, however, have a category in which to place those patients who have recurrence five years or later after the primary treatment. An eight-year criterion of cure is a far safer one to employ than a five-year one.

Our present technic of treatment includes platinum screening and it will be interesting to note whether its employment with a greater radium dosage will play a part in bettering results. The larger dosage of radium, 4,800 mg. hr., seemed to produce severe local and general reactions, and vesicovaginal fistulas developed in a number of cases. For this reason we decreased the dosage, although our greater number of five-year "cures" occurred among those patients in whom the larger dosage was employed. The method of screening may in part have been responsible for the severity of the reactions with the larger radium dosage.

SECONDARY ABDOMINAL PREGNANCY

REPORT OF TEN CASES

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(From the Department of Gynecology, College of Medicine, Ohio State University)

THE interest inherent in any type of ectopic pregnancy is so augmented in a case of secondary abdominal pregnancy that each case warrants special study. Secondary abdominal pregnancy is interesting not only because of its infrequency, but because of the many problems involved in its diagnosis and treatment. In the general management of the common types of tubal ectopic pregnancy, once operation is decided upon, the surgeon is confronted with the problem of hemostasis and supportive treatment. Secondary abdominal pregnancy may present further complications, depending upon the size and location of the placenta and the extent to which its implantation has handicapped the function of the abdominal structures to which it has attached itself.

The ten cases of secondary abdominal pregnancy which will be reviewed here were encountered on the service of one of the writers (P. J. R.) at University Hospital during the period from Jan. 1, 1928, to July 1, 1935. During this period of seven and one-half years, 3,437 cases of pregnancy were admitted to University Hospital. The incidence of secondary abdominal pregnancy in this series, then, is 0.28 per cent of all pregnant women admitted.

ETIOLOGY

The consensus at the present time is that most, if not all, abdominal pregnancies are secondary to tubal gestation. The mechanism by which the abdominal implantation takes place may be tubal rupture or tubo-abdominal abortion. There are very strict criteria which must be fulfilled before a case may be considered as primary. Before a case can be accepted as primary, the tubes, ovaries, and broad ligaments must be demonstrated to be normal; there must be no evidence of penetration of the broad ligaments by the fimbriated ends of the tubes, and there must be no evidence of interligamentary rupture of the tubes. Furthermore, there must be no indication of escape of an ovum from the uterine cavity. Best, in 1931, reported a case of primary abdominal pregnancy and quoted several others which were considered primary. Careful review of the cases which he reported, however, leaves a doubt as to the authenticity of some of them.

We have found no significant history of previous pelvic infection in our cases, with the exception of one patient, who had had a pelvic tumor

removed "through the vagina." Our cases bear out in a measure the old contention that a relatively long period of sterility precedes an ectopic gestation. Two women had not been pregnant for twelve years; 1, for ten; 4, for nine; 1, for three; and 1 was a nullipara.

SYMPTOMATOLOGY

Menses.—In our cases there was not invariably a history of a missed period before the onset of the illness. Two patients missed no periods; four missed one month; one missed two months, and three patients gave no definite time for the onset of symptoms. Of these three, one became ill about six months after the last menstrual period; one was not sure of the time of onset, and one was a Mexican immigrant, unable to give an understandable history.

Pain.—This was of universal occurrence in all of our patients. It was localized twice in the right side, twice in the left, five times in the lower abdomen, once in the back, and by two patients it was localized as originating in "the womb."

Fainting or Equivalents.—Symptoms of this nature appeared only twice. One patient experienced actual fainting and the other had repeated attacks of vertigo.

Gastrointestinal.—Constipation which increased gradually from the onset of the present illness was the outstanding gastrointestinal complaint. It was present in seven of these cases. In six of them, as will be seen later, the placental attachment was on the lower sigmoid, colon or rectum, thus giving an anatomical basis for this complaint. Only two patients gave a history of nausea and vomiting during their illness.

Genitourinary.—Four cases gave symptoms of bladder irritation such as frequency, dysuria, and burning. In none of the four, however, did the site of placental attachment offer basis for the complaint. The bladder was involved in the placental site only once. In this case, where the placenta was partially attached to the vesicle peritoneum, the patient had no bladder symptoms.

Bleeding.—This occurred in six of our cases, and was usually (four cases) preceded or accompanied by cramplike pains. In one case, the pain followed the bleeding.

The above symptoms agree very closely with the composite symptomatology as given by Cornell and Lash. "The usual patient suffering from early abdominal pregnancy missed one or two periods. At the time of, or slightly before, the appearance of vaginal bleeding she notices some discomfort in the abdomen—syncope may or may not be present, or only dizziness may be noticed."

Laboratory.—Blood: The average admission red blood cell count in this series was 3,000,000. The lowest was 1,820,000, and the highest 4,250,000. The average Hg was 55 per cent. The average white cell count was 11,700; the highest, 17,550; and the lowest, 7,300. Differential counts were usually practically normal.

Urine: The urinalyses were not especially significant. Five had a trace of albumin and six had white blood cells in the urine. The sedimentation time was found to be rapid in those patients who were most anemic, a usual occurrence. No other laboratory procedures were found to be of special significance.

DIAGNOSIS

The diagnosis of secondary abdominal pregnancy rests primarily, of course, upon the history as outlined above. This, plus findings indicative of pregnancy, such as softening of the cervix, blueness of the cervix, breast changes, etc., and the presence of a pelvic mass may be further

substantiated at times by a positive Friedman or Aschheim-Zondek test. In the later stages of gestation a fetal shadow by x-ray may be present. Mendenhall injects iodized oil into the uterine cavity to prove it distinct from the mass. We have not tried this test on any of our patients. Many patients present such a varied symptomatology that diagnosis is uncertain even after all known procedures have been exhausted. Usually, however, some time during the course of the illness, some intraabdominal condition occurs which demands investigation by laparotomy, even though no definite diagnosis has been made.

TREATMENT

The first consideration is that of operability. If there is no sudden intraabdominal catastrophe, the patient should be put to bed for rest, and a complete check of her blood, urine, and general condition should be made. Transfusion before, during, or after operation should be decided upon, depending upon the grade of anemia present and the urgency of operation. The patient's operability having been determined, the surgeon must decide upon the most favorable time for operation. Jeff Miller, discussing operation at diagnosis, or when labor ensues, or when fetal death occurs, favors the latter, inasmuch as at this time the placental blood supply is diminished with consequent lessened danger of hemorrhage.

Handling of the placenta, the most important consideration once the abdomen is opened, may be done in one of two ways. (1) Marsupialization: By this method, the pelvic cavity is packed and the placenta allowed to slough. (2) Division of the umbilical cord, leaving the placenta in situ, to be removed through absorption. Cornell offers the following suggestions in handling the placenta: If no infection is present, leave the placenta in place without drainage. If there is infection, or if the fetus has been long dead, marsupialize. This gives a longer period of drainage, but a good result. In our series, so-called marsupialization was used almost exclusively. Only in one patient, who was in extremis on the operating table, was the incision closed without drainage. We feel that drainage is a safeguard. Even though removal of the gauze is rather painful, the pressure of the gauze pack is sufficient to control most bleeding and acts as an indicator of any especially active hemorrhage. Furthermore, it affords drainage for any infection present.

In the cases herein reported, culdesac drainage consisting of plain gauze packing was used three times, while gauze packing brought out through the abdominal wound was used seven times. In only one case was culdesac gauze used alone. One case had both culdesac and abdominal gauze plus abdominal Penrose tubing. Our method of removing these drains is to begin the first postoperative day and remove them fractionally in six days. The percentage of removal by days is as follows: first and second days, 12½ per cent each; third and fourth days,

25 per cent each; fifth and sixth days, 12½ per cent each. Whenever possible, the placenta in whole or in part was removed manually, especially any detached portions, along with the fetus, if it could be found, and all of the old blood present. The mortality for this series was 20 per cent.

Our cases are reported in detail as follows:

CASE 1.—R. A., a Mexican immigrant twenty-nine years old, was admitted to the Medical service of the University Hospital on Feb. 18, 1928, because of probable obstruction of the bowel, accompanied with severe abdominal pain, nausea, and vomiting. The physician who referred her to the hospital had her under his care for an assumed normal pregnancy. She complained of progressive constipation which had increased steadily in severity since September. There had been some pain in the right lower quadrant. Vomiting and loss of weight had been marked during the few weeks preceding admission. It was impossible to obtain further details of her history because of her inability to speak or understand English or classical Spanish.

Upon examination, she was found to be well developed but poorly nourished, with moderate abdominal distention and dullness in both flanks. There was a right lower quadrant mass extending to the left of the midline and to the umbilicus. Pelvic examination revealed a large pelvic mass pushing the cervix forward and downward. There was a marked tenderness in both fornices. The patient was markedly anemic with corresponding pallor. The remainder of the physical examination was not significant. After consultation with the heads of the departments of Gynecology and Obstetrics, the patient was transferred to Gynecology. X-ray of the pelvis revealed no fetal shadow. The urine contained granular and hyaline casts with a trace of bile; a positive acetone persisted throughout her hospital stay. Her admission blood count showed 2,390,000 red cells, 16,000 white cells, and a Hg of 60. The differential count was normal. No other laboratory procedures were significant.

The patient was prepared for operation with a diagnosis of pregnancy with impacted uterus and dead fetus, an attempt to be made to correct the impaction. Vaginal examination under an anesthetic, however, gave the impression of an extra-uterine pregnancy and the abdomen was opened. A pelvic mass was found to which the intestines and omentum were adherent. The pelvis was filled with old, partly organized blood clot. The mass proved to be an abdominal pregnancy, the size of the fetus indicative of a six or six and one-half months' pregnancy. It was located in the left side of the pelvis and the placental attachment included the sigmoid. The intestine above the site of the implantation of the placenta in the sigmoid was greatly distended. Below the point of implantation the gut was collapsed. The lumen of the bowel was seriously encroached upon at this point. The operative procedure consisted of manual removal of the fetus and a part of the placenta. The part attached to the sigmoid was not disturbed for fear of causing perforation of the bowel. The patient did not do well following operation and required cardiac stimulants, fluids, etc. A suitable donor could not be obtained for transfusion. Her condition steadily grew worse and she died on her third postoperative day. Autopsy was not performed.

CASE 2.—E. A., colored, aged thirty-six, entered the hospital March 5, 1930, complaining of bleeding from the vagina and pain in the lower abdomen. Her illness had begun Jan. 24, 1930, with bleeding, and had continued in attacks lasting from two to three days, with intervals of one to two days, until the time of her admission to the hospital. The pain had been very sharp for a few hours at the onset, but

since then had been a dull ache in the lower abdomen, especially on the left side. There had been a heavy, foul vaginal discharge for a few weeks preceding admission. There was no history of pelvic infection or operation, and no bowel or bladder symptoms. There had been no fainting or its equivalent. She had had three full-term pregnancies, the last one nine years before admission. There had been no miscarriages. Her last menstrual period was Dec. 18, 1929.

Physical examination was negative except for the following: The abdomen was pendulous, with a tender mass low on the left side; the uterus could be felt above the pubis distinct from this mass. The pelvic examination revealed the cervix to be anterior, large and boggy, with stellate lacerations and a marked foul, purulent discharge. There was a tender mass in the left side anterior to the uterus. Urinalysis was not remarkable. The blood counts revealed no secondary anemia or evidence of infection. The sedimentation rate was increased. No other laboratory procedures were significant. A diagnosis of left tuboovarian mass with probable extrauterine pregnancy was made, and surgery was decided upon.

At operation the cervix was found to be large and soft, with a brownish red discharge. There was a mass to the left and partly anterior to the uterus, soft and dark red in color, which proved to be an abdominal pregnancy. The placental attachment was attached to the peritoneum of the bladder, anterior leaf of the right broad ligament, the lower left lateral and anterior abdominal wall. The broad ligament vessels were engorged. There were several angulations of adherent small bowel. The uterus was the size of a three months' pregnancy, and note was made of the possibility that it contained a second fetus. The abdominal pregnancy was removed manually and hemostasis was accomplished by hot packs and suture ligation. Culdesac gauze drainage was inserted and brought out through the abdominal wound. The patient developed a mild lobar pneumonia in both bases from which she recovered nicely and was discharged from the hospital on her forty-sixth postoperative day.

CASE 3.—D. McG., white, aged thirty-seven, entered the hospital March 7, 1931, complaining of vaginal bleeding and pain in her right side. During her regular menstrual period, Dec. 23, 1930, she had had more cramplike pains than usual and had passed a large blood clot. Nothing more of significance was noted until Jan. 1, 1931, when she experienced a sharp cramplike pain in the lower back and "felt as though her bowels would move." A bowel movement followed, accompanied by vaginal hemorrhage, which left her very weak. A physician who saw her at that time told her she had had a miscarriage. The vaginal bleeding which accompanied this attack continued for three weeks, ceased, and then began again on January 30, and continued until her admission to the hospital. At that time (January 30) she also complained of weakness and vertigo. Her past history was irrelevant except for the removal of a pelvic tumor "through the vagina" in 1922. She had had one pregnancy with a premature delivery in 1919. The last menstrual period was Nov. 10, 1930. There had been a marked anorexia during her entire present illness.

Physical examination was not remarkable except for the following: There was tenderness in both lower quadrants, especially the right. A tumor mass was palpable in the right lower quadrant—tender, firm, and fixed. The cervix was small, anterior, pushed to the left and upward, continuous with the tumor mass, and presented a bloody discharge. The whole right pelvis was filled with a solid tumor mass which extended across the midline. This mass was moderately tender and fixed. X-ray revealed no evidence of intraabdominal pregnancy. Laboratory procedures were not significant except for an increased sedimentation rate. The Friedman test for pregnancy was negative. A diagnosis of abdominal ectopic pregnancy was made and the abdomen was opened. The pelvic inlet was sealed with recent

intestinal and omental adhesions. The pelvis was filled by a mass whose posterior surface felt smooth-like placental tissue. The villous attachment was to the posterior surface of the uterus, both broad ligaments, the base of the culdesac, and the mesorectum.

The entire pregnant mass was released by finger dissection. There was no placental attachment to the gut. Manual extraction of the placenta and fetus was accomplished and a right salpingectomy was performed. The drainage consisted of a culdesac gauze drain, rubber tubing into the culdesac and Penrose tubing brought out through the abdominal wound. The postoperative course was uneventful and the patient was discharged from the hospital on the thirty-third postoperative day. Communication with this patient Sept. 9, 1935, revealed that she was in good condition and has menstruated regularly without pain. There was no drainage from the abdominal wound after her release. There have been no subsequent pregnancies.

CASE 4.—M. T., a white woman, thirty-three years old, entered the hospital March 11, 1932, complaining of pain in the right side. The onset of her illness began Feb. 1, 1932, with an attack of influenza which was accompanied by a moderate cough and constipation. On February 21, she became nauseated, vomited, and experienced general abdominal pain. On March 8, there was a "sharp spasm of the womb," with sharp pains in the right lower quadrant, cold sweat, dizziness, nausea, vomiting, and syncope which lasted about ten minutes. She was confined to bed following this attack and had improved generally except for a residual soreness in both lower quadrants. There was no history of any previous pelvic infection or operation. She had had six pregnancies with two miscarriages, one of these terminating the last pregnancy at one month in 1929. There had been constipation, urgency of urination, dysuria and nocturia for the duration of the present illness. The last menstrual period was Feb. 13, 1932. Physical examination was not remarkable except for diffuse tenderness in the lower abdomen and the pelvis which revealed the cervix to be anterior, pushed downward and tender to palpation. The uterus was not palpable. There was marked tenderness in both adnexa. Urinalysis was not remarkable. Blood examination showed a Hg of 30 per cent with a red cell count of 3,020,000 and a white cell count of 7,300. The differential was normal.

Operation was decided upon with a preoperative diagnosis of ectopic pregnancy. When the abdomen was opened, a pregnancy the size of a grapefruit was found, to which the intestines and omentum were adherent. There was a large blood clot adherent to the free margin of the omentum. The lower posterior abdominal wall and posterior uterine wall formed a part of the wall enclosing this mass. Degenerative changes were evidenced by the foul odor and circulatory changes present. The abdominal pregnancy was removed and a right salpingo-oophorectomy was performed. Drainage consisted of one piece of gauze brought out through the abdominal wound and one piece of gauze brought out through the culdesac. The patient was given a blood transfusion the day after operation. The convalescence was not remarkable in any way and she was discharged on the thirty-fifth postoperative day. Subsequent examination of this patient has not been possible.

CASE 5.—B. H., colored, aged thirty-one, entered the hospital July 4, 1932, in a very critical condition, complaining of sharp, cramplike pains in the lower abdomen, nausea, vomiting, a vaginal discharge, backache, and pain and burning on urination. Her illness dated from June 10, or about three weeks before admission. At that time, following a meal, she experienced a sharp cramplike pain in the abdomen which lasted about five minutes. Nausea and vomiting persisted for the next two weeks upon ingestion of food or drink. For the week preceding

admission she had been able to retain food. The lower abdominal pain had persisted and grown steadily worse. There was no history of previous pelvic inflammation. She had had an appendectomy in 1926. There had been one pregnancy which had resulted in miscarriage.

Physical examination revealed a very ill individual, with marked pallor and rapid pulse. The blood pressure was 124/72. The abdomen was enlarged to the size of a six months' pregnancy, with rigidity and tenderness in both lower quadrants and dullness to percussion over the entire uterine area. No masses were palpable. Upon pelvic examination, the uterus was found to be enlarged, pear-shaped, anterior in position, and not freely movable. The adnexa, especially the left, were very tender. Urinalysis was not significant. Examination of the blood showed 1,820,000 red cells with a Hg of 20 per cent, 17,550 white cells, and a normal differential count. The Wassermann was negative; the nonprotein nitrogen, 30; phenolsulphonephthalein 30 and 10; and the sedimentation rate was very rapid. The Friedman test for pregnancy was positive. A diagnosis of ectopic abdominal pregnancy was made. Since no suitable donor was obtainable, and because her condition was rapidly becoming worse, emergency operation was decided upon as a possible life-saving measure.

At operation the tumor mass was found to consist of clotted blood, placental tissue, fetus and umbilical cord. A portion of the placenta was unattached. This portion had been attached to the bowel and the lower anterior abdominal wall. The uterus contained multiple fibroids, some of which were calcified. The upper abdomen was filled with a large amount of semiclotting blood. The patient was in extremis. The detached fragments of placenta, the fetus and cord were removed, and the abdomen was closed without drainage. Despite supportive treatment, the patient died three hours after operation.

CASE 6.—F. B., aged twenty-seven, was admitted to the obstetric service Aug. 29, 1932, complaining that upon July 1 a slight vaginal bleeding started and lasted for one month. Six weeks preceding admission, there had been some lower abdominal pain which had lasted for one week. On August 29, the day of admission, there was a rather severe attack of vaginal bleeding accompanied by severe lower abdominal pain. There was no history of previous pelvic infection or operation. There had been one pregnancy with full-term delivery in July, 1931. The last menstrual period was June 12, 1932. There had been increasing constipation during the present illness. Physical examination revealed no abnormalities except the following: The uterus was enlarged to within two fingerbreadths of the umbilicus and was regular in outline. No fetal heart sounds were audible. Patient was dyspneic and anemic, with a blood pressure of 130/70. The urine was negative. The blood showed a Hg of 37 per cent with a red count of 2,390,000; there were 12,000 white cells with a normal differential. The sedimentation time was moderately rapid. No other laboratory procedures were pertinent.

The patient was prepared for operation. A culdesac needling revealed the presence of old and fresh blood in the peritoneal cavity. This prompted a diagnosis of ruptured ectopic pregnancy. When the abdomen was opened, it disclosed an abdominal pregnancy of about three and one-half months. The placenta was attached to the posterior surface of the left broad ligament, the mesosigmoid and the left lower margin of the omentum. Rupture of the membranes had allowed the escape of amniotic fluid which was mixed with blood and filled the pelvis. There was active hemorrhage from some portions of the placenta. The fetus, blood, and all of the loose placenta were removed manually. The abdomen was closed with a pelvic gauze pack. A blood transfusion was given on the first and on the second postoperative days. The convalescence was uneventful and the patient was discharged on her eighteenth postoperative day.

CASE 7.—A. D., a white woman, thirty-two years old, entered the hospital Aug. 29, 1933, complaining of lower abdominal cramps. She dated the onset of her illness as June 4, 1933, when she suffered a cramplike pain in the lower abdomen and passed a large clot of blood per vaginum. This was immediately followed by vomiting, chills, and an increase in temperature. Since that time she had had repeated, intermittent, sharp pains in the uterine region, referred to the labia. There had been some dyspnea after such an attack the week before admission. She had been confined to bed since the beginning of her illness. Nocturia was the only genitourinary symptom. There had been three full-term pregnancies, the last in 1924. There was no history of previous pelvic infection or operation. The last menstrual period was April 2, 1933.

The pertinent physical findings were: tenderness in the left lower quadrant on direct palpation and referred pain from pressure on the opposite side; tenderness in the right costovertebral wall. The uterus was palpable through the abdominal wall. Pelvic examination showed deep stellate lacerations of the cervix. The uterus was the size of a grapefruit, regular in contour, anterior in position, and fixed. Both adnexa were tender and fixed, with bulging in both lateral fornices. The laboratory findings were negative except for a marked secondary anemia. The red cell count was 2,370,000 with a Hg of 48 per cent, and a corresponding rapid sedimentation rate. A diagnosis of secondary abdominal pregnancy was made.

At operation, a diagnostic needling of the culdesac revealed old blood. The pelvis and lower abdomen contained an abdominal pregnancy which was located posterior to the uterus. The placenta was attached to the posterior surface of the right broad ligament, to the right lateral posterior margin of the uterus, and to the cecum, omentum and several loops of small intestine. Notation was made of the possibility of penetration of the small intestine by chorionic villi. The abdominal pregnancy was removed as completely as was compatible with safety. There was very little active bleeding. Pelvic gauze brought out through the lower angle of the incision afforded drainage. The patient received a blood transfusion immediately after operation and another on the fourth day. Her remaining convalescence was uneventful, and she was discharged sixteen days after operation. When she was examined April 10, 1934, pelvic examination was negative.

CASE 8.—M. T., a white woman, thirty-one years old, was admitted to the hospital on Sept. 23, 1933, complaining of pain in the left side and vaginal bleeding off and on for eight weeks. On July 23, just two months before admission, this pain had lasted unusually long and was followed by profuse bleeding. This experience had recurred since, always accompanied by dizziness. There had been some constipation, dysuria, and nocturia ever since the July attack. Low backache had also been rather constant. The attacks of pain were described as steady and sharp. She had had one pregnancy with full-term delivery in 1929, and no history of previous pelvic infection or operation. The last menstrual period was July 9, 1933.

The abdominopelvic examination disclosed a tender mass the size of a small grapefruit located just above the fundus of the uterus. The uterus was slightly enlarged, but the mass did not seem to be continuous with it. Both adnexa were tender, but otherwise negative. There was a moderate anemia of 3,190,000 red cells with 52 per cent Hg. There was no other pertinent laboratory finding. The location of the mass suggested a preoperative diagnosis of secondary abdominal pregnancy, which was confirmed by operation.

At operation, chorionic villi were found attached to the lower margin of the omentum, to the sigmoidorectal juncture, to a small portion of the cecum and to several loops of small intestine. The saccular portion of the mass extended a short distance beneath the fundus of the uterus and behind the left broad ligament. The membranes were intact and contained semicoagulated blood and fluid. All

excess free blood was removed, and the placenta was allowed to remain. Pelvic gauze packing was introduced into the sac and brought out at the lower angle of the abdominal wound. The postoperative course was uneventful and the patient was released sixteen days after operation. A written report from her Aug. 21, 1935, stated that the wound had drained for one week only after she left the hospital. Her general condition was good. At the time of the report she was three months pregnant.

CASE 9.—S. S., white, aged thirty-six, was admitted to the hospital Dec. 1, 1933, complaining of bleeding from the vagina and pain in the lower abdomen. The bleeding had begun six weeks after her last menstrual period (Aug. 2, 1933) and had been present about 50 per cent of the time since. It was of moderate severity, worse when standing. She had been confined to bed for six weeks preceding admission. The pain, which she described as cramping in type, had continued throughout her present illness. She had felt a "growth" in the lower left quadrant. Constipation had been the only gastrointestinal symptom. There were no genito-urinary symptoms. There was no history of previous pelvic infection or operation. She had had three pregnancies, the last in 1931. There was one miscarriage in 1921.

Physical examination showed that the skin and mucous membranes were pale. The thyroid was slightly enlarged. A slightly movable mass filled the entire pelvis and lower abdomen, being somewhat higher on the left where it reached halfway to the umbilicus. Pelvic examination showed that the cervix was dislocated anteriorly, being pushed forward by the pelvic portion of the mass. There was no culdesac tenderness. No other physical findings were pertinent. Urinalysis, in five specimens, showed 5 mg. of albumin and many white blood cells per high field. The red cell count was 3,910,000 with a Hg of 65 per cent. No other laboratory procedures were significant. A preoperative diagnosis of uterine fibroids with a cystic mass in the left side was made.

When the abdomen was opened, this cystic mass proved to be a walled-off ectopic pregnancy. The placenta was attached to the posterior surfaces of the uterus and broad ligaments and to the appendix. The remainder of the sac was adherent to the rectum and omentum. The operation consisted of release of adhesions and removal of the abdominal pregnancy. A pelvic gauze pack was inserted and brought out through the lower angle of the abdominal incision. The postoperative course was rather stormy for six days. On the sixth day, a posterior colpotomy was done for the drainage of a postoperative pelvic abscess. From that time, the patient's temperature, which had risen to 103° F., dropped slowly and convalescence proceeded. She was released on the thirty-first day after her first operation. A follow-up report of this case on Aug. 21, 1935, stated that she had drained slightly from the abdominal wound for two weeks following release. Her general condition was excellent and her only complaint was moderate constipation.

CASE 10.—E. T., white, aged thirty-seven, entered the hospital Feb. 26, 1935, complaining of feeling "tired and run down" for the past six months. Shortly after the beginning of this trouble, she had begun to notice pain in her left lower quadrant—usually dull, but occasionally sharp. There had been a vaginal discharge for one month preceding admission and a loss of 30 pounds in weight during the six months. There had been no chills or noticeable fever. Anorexia and constipation had been marked since the onset and urinary frequency had been present for the last three months. There was no history of previous pelvic infection or operation. She had had two full-term pregnancies. Her last pregnancy, in 1925, had terminated in miscarriage at one and one-half months. The last menstrual period was Aug. 17, 1934.

Physical examination revealed moderate pallor, tenderness under the right costal margin, and a hard tumor in the lower abdomen extending from the pubis to within

three fingerbreadths of the umbilicus on both sides. This mass was neither movable nor tender. Pelvic examination showed that the cervix was posterior in position and pushed downward; it was of increased size and contained a transverse laceration. The uterus was increased to four times normal size and was not distinctly palpable from the tumor mass. This mass was irregular in shape, partly fixed, and filled the pelvis. The adnexa were tender. Laboratory examination was not remarkable except for a moderate secondary anemia and a slightly rapid sedimentation time. The Friedman test for pregnancy was negative. No definite preoperative diagnosis was made, but an exploratory laparotomy was decided upon.

The operative findings were: The cervix was enlarged, and the uterine cavity was three to four inches in length. There was a left lateral pelvic mass fast to the hollow of the ilium extending to the crest of the ilium. It was slightly movable and had pushed the uterus to the right. It appeared to be a secondary abdominal pregnancy, the sac of which was intact with dilated veins on the anterior surface. The contents of the sac were macerated and consisted of a semidegenerated fetus and placenta. The placenta was attached to the posterior surface of the left broad ligament, to the left lateral pelvic wall, and to the lateral margin of the mesentery of the rectum and lower sigmoid. Finger dissection and separation of the placenta were accomplished without hemorrhage. The sac was packed with gauze. Suture ligation of the dilated veins was performed. One piece of abdominal gauze was inserted outside the sac and both pieces of gauze, plus one piece of Penrose tubing, were brought out through the lower angle, of the abdominal incision. The postoperative course was uneventful except for an unaccountable chill on the fifth postoperative day and a sudden rise in temperature to 104° F. six days later.

The patient was discharged twenty-three days after operation. A report from this patient on Aug. 21, 1935, stated that she felt well and had gained weight. The abdominal wound had drained slightly for two months after her release. Her menstrual periods had been regular and painless.

SUMMARY

Ten cases of secondary abdominal pregnancy have been studied as a basis for this discussion. While recognizing the possibility of primary abdominal pregnancy, we are of the opinion that its occurrence must be exceedingly rare. The incidence of secondary abdominal pregnancy in our series, reported here, is 0.28 per cent. A relatively long period of sterility preceding the ectopic gestation was a common factor in this series. Pelvic infection, on the other hand, did not seem to play a noticeable part in predisposing the patients to the development of secondary abdominal pregnancy. Although at times a history of disturbed menses was suggestive of ectopic pregnancy, we do not find that it was a guide in diagnosing secondary abdominal pregnancy.

Progressive lower abdominal pain, associated with constantly increasing constipation, was an outstanding symptom. The location of the placenta within the abdomen and its tendency to attach itself to the left colon offers an anatomical explanation for both of these symptoms. Abnormal uterine bleeding occurred in six of the 10 cases; while this was a diagnostic aid in pointing to the probability of ectopic gestation, it did not suggest the presence of secondary abdominal pregnancy. Similarly, the laboratory investigation was in no way pathognomonic of this condition.

The treatment of secondary abdominal pregnancy is ultimately surgical. Of necessity, surgical judgment alone can determine the time for operation. Preoperative blood transfusion of patients presenting a marked secondary anemia is the one most valuable therapeutic agent in minimizing surgical risk. In addition, postoperative blood transfusions may be employed to great advantage.

The surgical management of the attached portions of the placenta will always represent the major problem in any individual case of intra-abdominal pregnancy. As reported in this series, we have employed removal of detached fragments of the placenta together with insertion of gauze pack drainage which allows the remaining attached portions to marsupialize. In this series, two deaths followed operation, thus making a 20 per cent mortality. The placenta in one of these patients had produced a complete obstruction of the bowel by its massive implantation in the sigmoid. The patient at the time of operation was practically moribund. The second death might have been prevented had we been able to obtain blood for transfusion prior to operation.

REFERENCES

- (1) *Ferguson, E. R.*: J. A. M. A. 90: 436, 1908. (2) *Hirst, B. C., and Knipe, N.*: Surg. Gynec. Obst. 7: 456, 1908. (3) *Kynoch, J. A.*: J. Obst. & Gynec. Brit. Emp. 32: 546, 1925. (4) *LeDoux, L. A.*: AM. J. OBST. & GYNEC. 11: 395, 1926. (5) *Keeville, A. J.*: AM. J. OBST. & GYNEC. Abst. from Brit. M. J. 1: 80, 1928. (6) *Scott, W. A.*: AM. J. OBST. & GYNEC. 16: 699, 1928. (7) *Bubis, J. L.*: AM. J. OBST. & GYNEC. 17: 74, 1929. (8) *Lavell, Thos. E.*: AM. J. OBST. & GYNEC. 18: 379, 1929. (9) *Mendenhall, T. E.*: AM. J. OBST. & GYNEC. 18: 429, 1929. (10) *Blacklee, H. F.*: Brit. M. J. 2: 562, 1930. (11) *Osborn, Geo. R.*: AM. J. OBST. & GYNEC. 20: 98, 1930. (12) *Müller, C. J.*: Surg. Clin. North Am. 10: 733, 1930. (13) *Best, Paul A.*: J. A. M. A. 97: 1521, 1931. (14) *Cornell, Edward*: Surg. Clin. North Am. 11: 189, 1931. (15) *Gustafson, G. W., Meredith, E. J., and Hord, L. J.*: J. A. M. A. 98: 141, 1932. (16) *Scheffey, L. C., Morgan, T. R., and Stinson, C. M.*: AM. J. OBST. & GYNEC. 24: 103, 1932. (17) *Mendenhall, A. M.*: AM. J. Surg. 18: 270, 1932. (18) *Allen, Edward*: AM. J. OBST. & GYNEC. 25: 753, 1933. (19) *Counseller, Cox, Church, and Patterson*: Surg. Clin. North Am. 13: 961, 1933. (20) *Colvin, E. D., and McCord, James R.*: AM. J. OBST. & GYNEC. 27: 421, 1934. (21) *Cornell, E. L., and Lash, A. F.*: Med. J. 65: 462, 1934. (22) *Main, E. J., and Ware, Hudnell*: AM. J. OBST. & GYNEC. 27: 756, 1934. (23) *Lull, Clifford B., and Bernstine, J. Bernard*: AM. J. OBST. & GYNEC. 28: 126, 1934. (24) *Bronaugh, Wayne*: Ohio State M. J. 30: 823, 1934.

Marchese, Eugenio: The Kopaczewski Reaction in Gynecology, Folia gynae. 32: 389, 1935.

The author describes the Kopaczewski reaction and reports his findings in 100 gynecologic cases.

The Kopaczewski reaction consists in the addition of lactic acid to the blood serum of the patient. According to the length of time it takes the serum to jell, one may either suspect or exclude presence of a neoplasm. The serum of patients with neoplasms jells much more rapidly.

Marchese found the average mean for normal women to be 1,056 minutes, for pregnant women 1,032 minutes, for women with leucorrhea 885 minutes, for women with benign tumors 1,005 minutes, and for women with malignant tumors 165 minutes.

MARIO A. CASTALLO.

THE IMMEDIATE AND THE REMOTE EFFECT OF ABDOMINAL CESAREAN SECTION*

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THE complete story of abdominal cesarean section can be told only when one has studied the remote as well as the immediate effects of the operation. Statistics which deal with mortality register a mere fraction of the whole, for submortal cases, instances which fall only slightly short of fatal outcome, and lesser lesions, which at the time appear minor in nature, but may later cause difficulty, are left untouched. No estimate of the efficacy or degree of safety of cesarean section can be made without considering the end-results as well as the immediate morbidity and maternal fatality.

With these thoughts in mind a review of all the cesarean sections performed in a ward service of ten years' extent has been undertaken. Consideration has been given to ultimate results as well as to immediate outcome. The findings serve further to convince the author that cesarean section, in its many potentialities for danger, occupies an unparalleled position among abdominal operations.

From September, 1925 to September, 1935, 229 abdominal cesarean sections were performed in a charity service of 13,733 deliveries, a percentage of incidence of 1.6 per cent (Table I). Of the 229 patients operated upon, 57 (25 per cent) were previously unregistered and unattended in prenatal care, and 98 (43 per cent) were colored (Table IV). While these two factors had apparently little influence on the ultimate rate of morbidity and mortality, yet they present some idea of the social status of the patients treated.

TABLE I

Patients from dispensary service delivered from Sep- tember, 1925, to September, 1935		13,733
Number of cesarean sections		229
Cesarean section rate		1.6%

Performed by 14 different operators as follows:			
No. 1	62 operations	No. 8	8 operations
No. 2	37 operations	No. 9	7 operations
No. 3	28 operations	No. 10	7 operations
No. 4	26 operations	No. 11	5 operations
No. 5	18 operations	No. 12	3 operations
No. 6	16 operations	No. 13	1 operation
No. 7	10 operations	No. 14	1 operation

*Read at a meeting of the Obstetrical Society of Philadelphia, December 5, 1935.

The 229 cesarean sections were performed during the course of ten years by fourteen different operators. The highest number of operations performed by any one individual was 62, the lowest, 1.

MATERNAL MORTALITY

There were 14 deaths, a rate of mortality of 6.1 per cent. Septic infection accounted for 5 fatalities, while shock and hemorrhage in far-advanced placenta previa led to 4 sudden deaths on the operating table (Table II). Antenatal hemorrhage played an even larger rôle in mortality than these figures indicate, for of the two patients who died from postoperative pneumonia, one was an instance of central placenta previa and the other of premature separation of the placenta. Actually, in 42 per cent of the deaths, placenta previa and premature separation were etiologic factors.

Through the course of the decade, as indicated by the mortality rate for each two years, there has been a constant decrease in mortality rate (Table II). Advancements in organization, more efficient antenatal study of the disproportion cases, fewer admissions of unregistered and exsanguinated placenta previa patients, and better preparation of the latter for operation by transfusion have doubtless accounted for the improvement in results. When one hearkens to the older obstetricians, and looks back over a span of years, he is impressed with the observation that there are fewer and fewer of the hopeless emergencies, the obstetric calamities, being deposited at the last moment on the hospital steps, and that the hospital service must show as a result a constant lessening of operative fatality.

TABLE II. MATERNAL MORTALITY

14 in 229 = 6.1%
MORTALITY BY YEARS

1925 } 1926 } 5 in 47 = 10.6% 1927 }	1930 } 1931 } 3 in 36 = 8.3%
1928 } 1929 } 2 in 30 = 6.6%	1932 } 1933 } 3 in 58 = 5.1%
	1934 } 1935 } 1 in 58 = 1.7%
CAUSES OF DEATH	
Septic infection	5
Death on table from hemorrhage in placenta previa	4
Heart disease with postoperative failure	1
Anesthetic death (spinal)	1
Postoperative pneumonia	1
Postoperative pneumonia and pneumococcal meningitis	1
Liver degeneration and toxic psychosis	1

PUERPERAL MORBIDITY

Closely allied to mortality, call it the mother of mortality, is puerperal morbidity. While no uniform standard of recording morbid-statistics

has been agreed upon, the temperature chart method, unreliable though it is, has generally been accepted as a criterion. In the department at Jefferson any temperature, regardless of cause, which reaches 100.4° on any two days of the puerperium, not including the first twenty-four hours after delivery, is considered a manifestation of morbidity. Upon this basis 148 of the 229 operations of this series were followed by puerperal morbidity, a rate of 64.6 per cent (Table III). In this group are included also the fatalities which developed such temperature reaction.

TABLE III. PUERPERAL MORBIDITY

148 in 229 = 64.6%

Definition: Any temperature, regardless of cause, which reaches 100.4° on any two days during the puerperal period, not including the first 24 hours after delivery.

CAUSES	
"Reaction" from operation (True cause not detected)	48 = 16.6%
Infection abdominal incision	31 = 13.5%
Local uterine inflammation (Puerperal endometritis and metritis)	21 = 9.0%
Pneumonia	7 = 3.0%
Bronchitis	7 = 3.0%
Widespread septic infection	5 = 2.1%
Pyelocystitis	5 = 2.1%
Parametritis	4
Femoral and broad ligament phlebitis	4
Pelvic peritonitis	3
Pelvic abscess	2
Postoperative pulmonary collapse	2
Toxic psychosis	1
Meningitis	1
Tuberculosis	1
Ischiorectal abscess	1
Mastitis	1

"Reaction from operation," a sort of dumping ground for all cases in which no definite cause for morbidity could be detected, is given credit for 48 morbid temperatures (16 per cent of all operations). While this term seems inadequate, yet at present I know of none better to describe the phenomenon of temperature elevation without detectable cause. Possibly due to some protein reaction incident to the trauma of the cesarean birth, it is manifested in almost all patients; less noticeably in operations under local or gas anesthesia, and somewhat less frequently in clean, well-controlled private patients than in charity ward patients.

Infection of the abdominal incision accounted for, or was associated with, 31 cases of morbidity (13.5 per cent of all operations), a frequency of occurrence much greater than is encountered in other forms of lower abdominal surgery (of which more will be said later in connection with remote sequelae of the operation). A tender uterus and disturbed lochial discharge, taken as evidences of local uterine inflammation (puerperal metritis and endometritis), were found 21 times. Bronchial and pul-

monary inflammation occurred in 14 patients, infections of the urinary tract in 5, widespread septic infection in 5 (all of which terminated fatally), parametritis in 4, femoral and broad ligament phlebitis in 4, and so on down the list of puerperal complications to those of less frequent occurrence.

FACTORS IN PUERPERAL MORBIDITY AND MATERNAL MORTALITY

An endeavor has been made to trace out certain of the factors in puerperal morbidity and maternal mortality (Table IV). Stated at the outset, failure of registration, lack of prenatal care, and race, showed rather insignificant effect.

TABLE IV. FACTORS IN PUERPERAL MORBIDITY AND MATERNAL MORTALITY

	<i>Registration</i>		
	NUMBER	MORTALITY	MORBIDITY
Registered patients	172 = 75.0%	10 = 5.8%	117 = 67.0%
Unregistered patients	57 = 25.0%	4 = 7.0%	31 = 54.0%
	<i>Color</i>		
	NUMBER	MORTALITY	MORBIDITY
White	131 = 57.0%	7 = 5.3%	81 = 61.7%
Colored	98 = 43.0%	7 = 7.1%	67 = 68.3%
	<i>Type of Operation</i>		
	NUMBER	MORTALITY	MORBIDITY
Classical	180 = 78.0%	10 = 5.5%	118 = 65.0%
Low	32 = 14.0%	1 = 3.1%	22 = 68.0%
Cesarean section and hysterectomy	15 = 6.5%	3 = 20.0%	6 = 40.0%
Cesarean section and myomectomy	2 = 1.0%	0 = 0.0%	2 = 100.0%

Comparisons of the type of operation revealed that in 180 classical operations there was a mortality rate of 5.5 per cent and a morbidity rate of 65 per cent; in low cesarean sections the figures were 3.1 and 68 per cent, respectively. The series of low sections is too small to form a basis for significant comparison. Considering the fact, however, that the operation in our hands has been reserved for patients in labor, the results seem fairly satisfactory. It has been followed by higher temperature morbidity and by a greater number of pathologic lesions, e.g., parametritis, pelvic abscess, infection of the abdominal incision, than the other forms of abdominal delivery.

Another approach has been made to the problem of operative morbidity by reconstructing the temperature chart of each cesarean section on graph paper, using only the highest temperature of each day. In the instance of each type of cesarean section, depending also on the time of operation, the respective graph temperature lines have been superimposed on one another in an effort to elicit a common characteristic temperature zone. The results, illustrated in Figs. 1 to 6, prove rather interesting. To a considerable degree they reveal what may be expected in the way of temperature reaction when a given type of operation is performed at a given time.

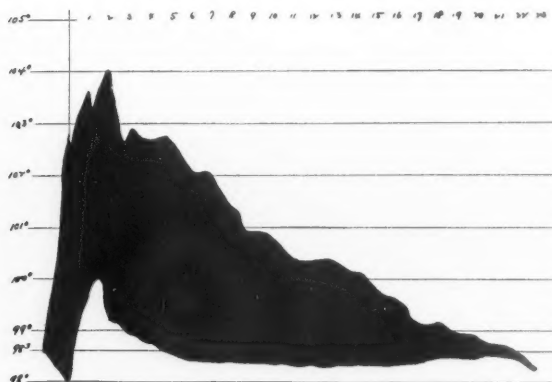


Fig. 1.—Temperature zone in all cesarean sections. Maternal mortality, 14 in 229, 6.1 per cent; puerperal morbidity, 148 in 229, 64.6 per cent; average number of postoperative hospital days, 18.

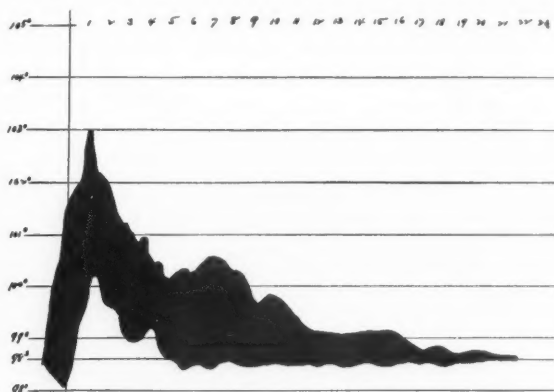


Fig. 2.—Temperature zone in elective classical cesarean sections for disproportion. Maternal mortality, 1 in 110, 0.9 per cent; puerperal morbidity, 61 in 110, 46 per cent; average number of postoperative hospital days, 16.

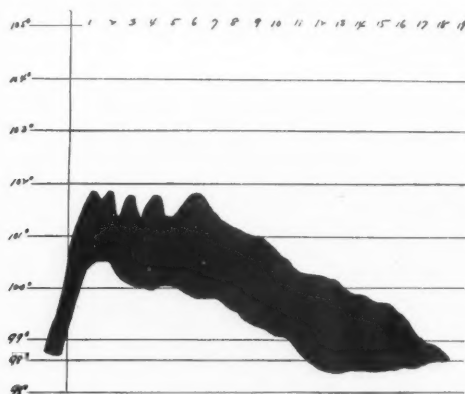


Fig. 3.—Temperature zone in classical cesarean section for disproportion, patients in labor less than twelve hours. Maternal mortality, 0 in 15, 0 per cent; puerperal morbidity, 8 in 15, 53 per cent; average number of postoperative hospital days, 18.

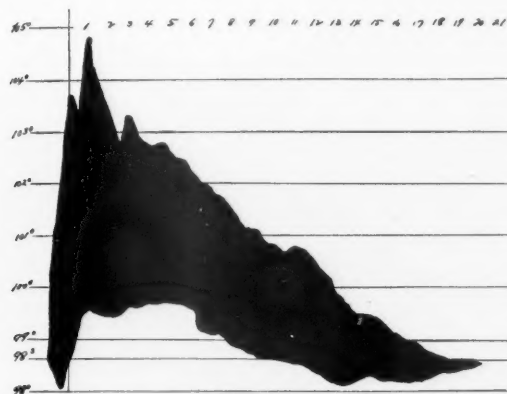


Fig. 4.—Temperature zone in classical cesarean sections for disproportion, patients in labor more than twelve hours. Maternal mortality, 3 in 38, 8 per cent; puerperal morbidity, 24 in 38, 63 per cent; average number of postoperative hospital days, 17.5.

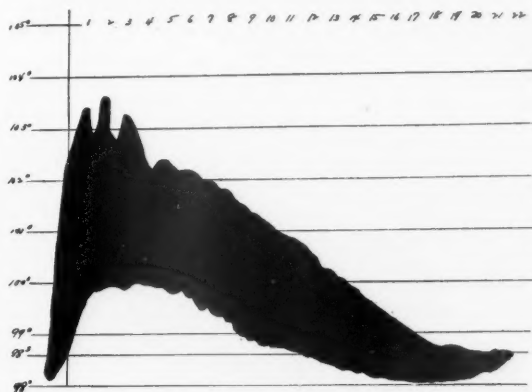


Fig. 5.—Temperature zone in low cesarean sections for disproportion, patients in labor. Maternal mortality, 1 in 32, 3.1 per cent; puerperal morbidity, 22 in 32, 68 per cent; average number of postoperative hospital days, 18.



Fig. 6.—Temperature zone in all cesarean sections under nitrous oxide and ether, or ether alone. Maternal mortality, 10 in 164, 6.1 per cent; puerperal morbidity, 112 in 164, 68 per cent; average number of postoperative hospital days, 17.5.

Notable, of course, is the contrast between classical cesarean section performed either as an elective operation or early in labor, and the operation when executed after twelve hours or more of labor. Quite significant, too, is the comparison of temperature zones in local anesthesia and ether anesthesia.

CESAREAN SECTION IN DISPROPORTION

Table V is a capitulation of the morbidity and mortality of cesarean section performed for disproportion. The elective classical operation in 110 patients, and the classical operation done before twelve hours of labor in 15 patients have a combined mortality of 1 in 122 or 0.82 per cent; while the operation done after twelve hours of labor has a mortality rate in classical section of 8 per cent and in low cesarean section of 3.5 per cent. It will be noted that the total mortality rate for cesarean section in disproportion is 5 in 191 or 2.6 per cent, a figure which is

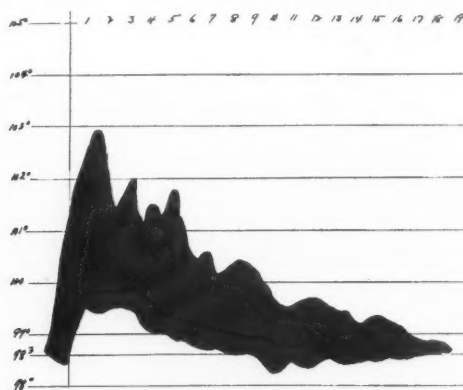


Fig. 7.—Temperature zone in cesarean sections under local, or local and nitrous oxide oxygen anesthesia. Maternal mortality, 3 in 62, 4.8 per cent; puerperal morbidity, 32 in 62, 52 per cent; average number of postoperative hospital days, 16.

much in contrast to the entire series of cesarean sections (6.1 per cent). It will also be seen that the deaths in disproportion share an equal rôle with the deaths of placenta previa in producing maternal fatalities.

Opinion has held that premature rupture of the membranes plays an important part in cesarean section death. In the group of 229 cases here reported, the membranes were ruptured prematurely in 16 instances; in 14 of these, puerperal morbidity developed (87.5 per cent); in one instance, fatality occurred. In the latter case the membranes had ruptured for two days before admission. The death was from septic infection (Table VI).

THE COURSE OF SUBSEQUENT PREGNANCIES

An always interesting but worrisome problem for the performer of cesarean section is that of the prognosis in future pregnancies. Sixty patients of this series were those observed in deliveries subsequent to one

TABLE V. THE PUERPERAL MORBIDITY AND MATERNAL MORTALITY OF CESAREAN SECTION IN DISPROPORTION CASES

1. Classical elective cesarean section.	
Maternal mortality	1 in 110 = 0.9%
Puerperal morbidity	51 in 110 = 46.0%
2. Classical cesarean section, section after less than 12 hours of labor.	
Maternal mortality	0 in 15 = 0.0%
Puerperal morbidity	8 in 15 = 53.0%
3. Classical cesarean section, section after more than 12 hours of labor.	
Maternal mortality	3 in 38 = 8.0%
Puerperal morbidity	24 in 38 = 63.0%
4. Low cesarean section.	
Maternal mortality	1 in 28 = 3.5%
Puerperal morbidity	18 in 28 = 64.0%
Total mortality rate for cesarean section in disproportion	5 in 191 = 2.6%
Disproportion and placenta previa as causes of mortality in cesarean section.	
Proportion of cesarean section deaths due to disproportion cases	5 in 14 = 35.7%
Proportion of cesarean section deaths due to placenta previa cases	5 in 14 = 35.7%

TABLE VI. EFFECT OF RUPTURE OF MEMBRANES ON THE MATERNAL MORTALITY AND PUERPERAL MORBIDITY IN CESAREAN SECTION

(Figures include patients whose membranes were ruptured either before onset of labor or more than 6 hours previous to cesarean section.)

Total cases	16
Maternal mortality	1 in 16 = 6.2%
Puerperal morbidity	14 in 16 = 87.5%

Fatal case: Patient with marginal placenta previa who had been bleeding slightly for one week and whose membranes had been ruptured for two days upon admission. Death from septic infection.

or more cesarean sections. One patient aborted and one patient who was observed in early pregnancy was lost sight of. Of the remainder, 8 delivered spontaneously, 4 with forceps, and 46 by abdominal section (Table VII).

Rupture of the uterus occurred in 3 instances of patients with previous cesarean section, all at the site of a classical uterine incision. In two cases the rupture was subperitoneal and the baby was delivered alive. In the third, the rupture was complete and the baby and placenta lay free in the peritoneal cavity. Patient 1 sustained an incomplete rupture

TABLE VII. PARTURITION IN SUBSEQUENT PREGNANCIES

Spontaneous delivery	8 = 13.3%
Forceps delivery	4 = 6.6%
Classical cesarean section	35 = 58.3%
Low cesarean section	7 = 11.6%
Cesarean section with hysterectomy	2 = 3.3%
Laparotomy for rupture of uterus with hysterectomy	2 = 3.3%
Sterilization	15 = 25.0%
Total vaginal deliveries	12 = 20.0%
Total abdominal deliveries	46 = 76.6%

during the last weeks of pregnancy. The rupture in Patient 2 was found upon performing a section early in labor. The complete rupture in Patient 3 was sustained during active labor. Laparotomy and hysterectomy were performed in 2 and 3; classical operation, repair of the uterine scar and sterilization of Patient 1. All the mothers survived.

In addition to the patients with actual rupture, there were 7 patients in whom at the time of subsequent operation a decidedly weak uterine scar was found. From a review of these patients' histories, and from a consideration of personal experience in ward and private practice, I am convinced that we have no accurate criterion of the condition of the uterine scar in subsequent pregnancy. The record of the temperature chart is certainly not dependable. While definite evidence of infection and purulent discharge is to be accepted as an indication of faulty healing, yet many patients who have had unrippled convalescence show pro-

TABLE VIII. MATERNAL MORTALITY AND PUERPERAL MORBIDITY IN SUBSEQUENT PREGNANCIES

	MORTALITY	MORBIDITY
Vaginal delivery	0 in 12 = 0.0%	2 in 12 = 16.0%
Abdominal delivery	2 in 46 = 4.3%	28 in 46 = 60.0%
Total	2 in 58 = 3.4%	30 in 58 = 51.8%
<i>Deaths</i>		
Septic infection		1
Chronic nephritis and pneumonia		1
<i>Causes of Morbidity in Abdominal Delivery</i>		
Reaction from operation (cause unknown)		12 = 25%
Infection of abdominal incision		10 = 22%
Local uterine infection		2
Pelvic peritonitis		1
Bronchitis and pneumonia		2

found weakness of the uterine incision in subsequent pregnancy. Possibly the position of the placenta, and the erosive action of the chorionic villi when the organ is implanted beneath the old incision, are more important factors in etiology.

The author has come to the conclusion that the burden of proof in subsequent pregnancies is not that the uterus might rupture, but that the wall is strong enough to sustain pregnancy and the strain of labor.

Peritoneal adhesions are encountered almost universally in subsequent cesarean sections. In 17 cases of the 46 abdominal deliveries they were described as being particularly dense. How great a hazard these may become in the production of intestinal obstruction is difficult to estimate. In this group of cases, no instances of immediate postoperative intestinal obstruction were encountered. In 2 patients, chronic intestinal obstruction was relieved at subsequent operations. Why this complication does not occur more commonly, I am at a loss to explain.

Fixation of the uterus to the abdominal incision, as a manifestation of peritoneal adhesion, was noted in 26 of the postoperative examinations; although it was determined that in those instances where the patient

was followed for a year or more, this condition which was so common soon after operation became much less evident as time went on. In most instances the uterus eventually became movable, sank into the pelvis, and in four patients even assumed a position of retroversion.

Hernia, umbilical and incisional, are a more common sequel of cesarean section than of other forms of lower abdominal operation. Several conditions account for this phenomena. In the first place, the incision, made as it is so often in a nonelective case and through an emergency prepared abdominal wall, and bathed with the inflammatory fluid of a potentially infected uterus, often becomes infected. Second, the thinned out abdomen of pregnancy is more difficult technically to suture, and the normal support of muscular structures is attenuated. The 4 cases of incisional hernia reported in our records are, I believe, a gross minimization of the frequency of this complication. I am certain, in view of the high percentage of infected incisions, that we will see as years go by a number more of these patients returning for the correction of incisional hernia.

Finally, abdominal pain as a remote sequel of cesarean section was not encountered frequently. A few patients, particularly in the low section group, complained of parametrial distress and tenderness, and several of the high section group, in whom the uterus was firmly and permanently fixed to the abdominal incision, had distress, at least until the passage of time accustomed the parts to this abnormal position.

Other complications and sequelae might well be included in a treatise of operative morbidity, if the limits of time and space permitted. Vesical symptoms are important; the effect of cesarean section in producing sterility might be considered, an effect I am not overly impressed by. Possibly enough has been recorded, however, to support the original contention of this paper.

SUMMATION

The results recorded and the data of the charts speak for themselves; there is little more to be added in summation. Doubtless many ward cases, and certainly many series of abdominal cesarean sections in private practice will show a lower mortality and morbidity rate. However, the same sources of complication and of inherent danger will be found present to greater or less degree: parametrial and womb infections, weakness of the abdominal incision with marked tendency to hernia formation, chronic adhesive peritonitis, unexpected weakness of the uterine incision with "giving way" in subsequent labors. He who carefully reviews his results will be impressed with the fact that this operation of cesarean section, necessary as it sometimes proves, is nevertheless an unsatisfactory recourse in the impossible obstetric situation.

Acknowledgment: I wish to thank Professor P. B. Bland for opening the files of his department and encouraging the presentation of this study. I am also indebted to Miss Rena G. Rosenfield and Miss Regina Conway for their competent assistance in the compilation of data.

DISCUSSION

DR. JAMES L. RICHARDS.—It has been estimated that one mother out of every 150 dies of complications of pregnancy or the accidents of labor, and for every patient who succumbs ten are seriously ill. In other words, the annual puerperal morbidity in this country totals approximately 250,000. Statistics show that puerperal morbidity increases proportionately with an increase in the number of operative deliveries of which cesarean section is the chief offender.

In reviewing the literature, one is impressed with the variety of standards employed in different clinics and by different individuals as criteria for morbidity. Would it not be best to regard, as morbid, all puerperia in which there is an elevation above 99° at any time. The fallacy of the commonly accepted criteria may be realized when one considers that a woman having an elevation of 100.4° on the second or third postoperative day, due to postoperative reaction, would be listed as having a morbid convalescence, while another patient may have a temperature range between normal and 100.3° during most of her postoperative convalescence, due to a low-grade wound infection, yet she would be classed as nonmorbid.

During the past five years and eleven months there have been 2,725 ward and private deliveries at the Bryn Mawr Hospital Maternity. Ninety cesarean sections have been performed by six members of the courtesy staff and by Dr. Behney and myself. Seventy-six (84.4 per cent) were of the classical type; 12 (13.3 per cent) of the cervical type; and 2 (2.2 per cent), cesarean sections with hysterectomy. In 33 of these patients the convalescence was morbid, based on a temperature of 100.4° on any two puerperal days, a morbidity of 36.6 per cent.

In 11 patients no cause could be found for the morbidity since the temperature was not elevated after the third postoperative day. Of the remaining 22, 3 developed wound infections; 3 femoral phlebitis; 3 local uterine infections; 2 pyelitis; 2 severe anemia (fever 101° following transfusions); 1 paralytic ileus with eventration; 1 cystitis; 1 subvesical hematoma; 1 bronchitis; 1 recrudescence of an old pulmonary tuberculous lesion; 1 bronchopneumonia. There were 3 deaths: 1 from intestinal obstruction, 1 from paralytic ileus with eventration, and 1 from puerperal eclampsia, a mortality rate of 3.3 per cent. Sixty-five of the cesarean sections were elective. Of that number, 25 had had previous abdominal deliveries. The morbidity rate in the elective cases was 17 per cent. There were no deaths. Of the 25 emergency cases, 20, or 80 per cent, were morbid. The three deaths occurred in this group.

DR. JOHN McGLINN.—At St. Agnes Hospital there is a rule that no cesarean section may be done without a consultation. This also applies to the Philadelphia General Hospital. We feel satisfied at St. Agnes that we have cut down the number of cesarean sections and therefore have avoided some of the associated disasters and complications.

On the other hand, I think we have been obsessed often times with the danger of examination of the patient during labor. Dependence on rectal examination frequently allows patients to go too far before the need of a section is recognized. If cesarean section must be done, the sooner it is done the better, and the patient should not be weakened by labor trials.

DR. PHILIP F. WILLIAMS.—There is one point of particular interest. In the last year in Philadelphia the percentage of cesarean sections in the total number of deliveries was practically the same as during the three years covered by the Maternal Mortality report of the County Medical Society. In the year of 1934, however, the mortality rate for the cesareans dropped 50 per cent from the cesarean mortality rate of the previous three years.

DR. MONTGOMERY (closing).—I believe that required consultation is a very splendid idea. Of great assistance also is the consultation with the roentgenologist. This brings the x-ray man to the hospital at hours which he considers ungodly but x-ray pictures after the patient is in labor are often of extreme value in deciding how to proceed and whether interference should be practiced at once. I think the x-ray consultants, in particular, should be included in this consultation policy.

THE BLOOD LOSS DURING NORMAL MENSTRUATION*

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IN ORDER to evaluate properly the significance of excessive menstrual bleeding as an etiologic factor in certain types of anemia, it is essential to have definite information as to the amount of blood that is lost with each normal period. A survey of the literature on this subject revealed no uniformity of opinion as to what constitutes the blood loss during normal menstruation. Some of the studies are based on the volume or weight of the menstrual flow without considering the admixture of uterine secretion, mucus, and epithelial debris, while others are based on an inadequate number of cases, so that the results are of questionable value. A summary of these various reports is given in Table I. It is to be noted that these studies have been made on women of various races and nationalities and in different climates. These estimates show a menstrual blood loss varying from 1 to 20 ounces and from 20 to 500 gm. The most generally accepted figures, however, are those of Hoppe-Seyler who determined the blood loss by the colorimetric estimation of the hemoglobin as acid hematin. Although the technical procedures were carried out with meticulous care, his conclusions are based on a study of only 15 women, 11 of whom he considered pathologic. In his 4 normal cases the blood loss varied from 26 to 52 c.c., and the average loss was 37 c.c.

PROCEDURE

Recognizing the fact that the limits of normal cannot be strictly defined because of individual and physiologic variations, it still seemed advisable to determine the menstrual loss in a larger series of individuals. Accordingly, the present study of 100 normal women was undertaken. These subjects, whose ages ranged from fifteen to forty-three years, were, for the most part, members of the hospital staff who were in good health and whose menses were considered to be normal in every respect. They were allowed to continue their usual work, since this was deemed more normal than restricted activity or bed rest. Women with an appreciable degree of anemia were excluded and, as an arbitrary point of separation, those with a blood hemoglobin below 10.20 gm. per c.c. (75 per cent of normal)¹ were not included.

*Supported in part by a grant from the Eli Lilly Co.

NOTE: This work was begun in association with Dr. C. W. Baldrige, who died November 22, 1934.

TABLE I

AUTHOR	MENSTRUAL BLOOD LOSS	REFERENCE
Anspach	4- 6 oz.	Gynecology, Philadelphia, 1924, J. B. Lippincott Co., p. 66.
Astruc	8- 10 oz.	Quoted by Novak: Menstruation and Its Disorders, 2: New York, 1931, D. Appleton-Century Co., p. 91.
Baudelocque	3- 4 oz.	Quoted by Novak, loc. cit.
Crossen	150-300 c.c.	Diseases of Women, St. Louis, 1930, The C. V. Mosby Co., p. 829.
Das	55-200 c.c.	A Treatise of Midwifery, Calcutta, 1921, Thacker Spink and Co., p. 36.
Eichmann	2.61-61.25 c.c.	Inaugural Dissertation, University of Kiel, 1911.
Fitzgerald	14- 15 oz.	Quoted by Novak, loc. cit.
Freind	10 oz.	Quoted by Novak, loc. cit.
Fraenkel	30- 50 gm.	Physiologie der weiblichen Genitalorgane. Halban-Seitz Biologie und Pathologie des Weibes. Vol. 1, Berlin, Urban and Schwarzenberg, 1924, p. 550.
Fulkerson	12-15 napkins	Textbook of Gynecology, Philadelphia, 1929, P. Blakiston's Son and Co., p. 104.
Galen	18 oz.	Quoted by Novak, loc. cit.
Gebhard	90-240 gm.	Die Menstruation, Veit's Handbuch d. Gynec. 3: 1898, p. 1.
Gilbert	120-240 gm.	Quoted by Lahille: Ann. de gynéc. et d'obst. 72: 535, 1917.
Gley	200-500 gm.	Quoted by Lahille, loc. cit.
Gorter	Not over 6 oz.	Quoted by Novak, loc. cit.
von Haller	6-8-12 oz.	Quoted by Novak, loc. cit.
Haen	3- 5 oz.	Quoted by Cazeau: Theoretical and Practical Midwifery, Philadelphia, 1871, Lindsay and Blakiston, p. 107.
Hensen	100-200 gm.	Quoted by Hoppe-Seyler: Ztschr. f. physiol. Chem. 42: 545, 1904.
Hippocrates	20 oz.	Quoted by Novak, loc. cit.
Hoppe-Seyler	26- 52 c.c.	Ztschr. f. physiol. Chem. 42: 545, 1904.
Howell	100-200 c.c.	Textbook of Physiology, Philadelphia, 1933, W. B. Saunders Co., p. 1049.
Kelly	60-240 c.c.	Gynecology, New York, 1928, D. Appleton-Century Co., p. 118.
Lahille	20- 80 gm.	Ann. de gynéc. et d'obst. 72: 535, 1917.
Linnaeus (Frozen North) (Samoides)	Very little	Quoted by Novak, loc. cit.
Magendie	May be several pounds	Quoted by Novak, loc. cit.

TABLE I—CONT'D

AUTHOR	MENSTRUAL BLOOD LOSS	REFERENCE
Mayer	210 gm.	Die Bedeutung der Konstitution für die Frauenheilkunde. Veit-Stoeckel Handbuch der Gynecologie 3: München, 1927, J. Bergmann, p. 319.
Meigs	1- 20 oz.	Woman: Her Diseases and Remedies, Philadelphia, 1854, Blanchard and Lee, p. 425.
Novak	2-6-8 oz.	Menstruation and Its Disorders 2: New York, 1931, D. Appleton-Century Co., p. 91.
Penrose	2- 9 oz.	Textbook of Diseases of Women, Philadelphia, 1908, W. B. Saunders Co., p. 404.
Pasta	90-240 gm.	Quoted by Novak, loc. cit.
Penard and Abelin	100-200 gm.	Quoted by Lahille, loc. cit.
Prussak	100-150 gm.	Quoted by Curtis: Obstetrics and Gynecology 1: Philadelphia, 1934, W. B. Saunders Co., p. 287.
Viault and Jolyet	100-200 gm.	Quoted by Lahille, loc. cit.

Cellulo-cotton pads were utilized in the collection of the menstrual flow except for five individuals who employed vaginal cups. The collected material was analyzed for iron by a modification of the method of Reis and Chakmakjian.² The menstrual blood iron was converted into grams of hemoglobin and this, in turn, to the equivalent amount of the individual's blood. In the first fifty cases the total urine was analyzed for iron and that amount, which was in excess of the individual's normal urinary iron, was calculated as menstruated blood iron and added to the menstrual blood loss. Since the average amount of this urinary menstrual blood iron was equivalent to only 2.54 c.c. of blood for the entire period, this procedure was discontinued.

RESULTS

The data on each individual are given in Table II. The iron content of the menstrual flow in these 100 apparently normal women varied from 2.28 to 78.96 mg. which represents from 0.680 to 23.57 gm. of hemoglobin. When these values are translated to terms of cubic centimeters of blood having a hemoglobin content equivalent to that of the particular individual's intravascular blood, they represent a loss of from 6.55 to 178.69 c.c. The mean loss for the entire group was 50.55 c.c. with a standard deviation of 25.73 c.c., and it is seen from the data presented in Chart 1 that, while the greater number of cases actually fell in the 20 to 30 c.c. group, 50 per cent of the subjects lost between 23.21 and 68.43 c.c.

There was no correlation between the age of the individual and the amount of blood lost. There was, however, a difference between the blood loss in the unmarried (76 cases, mean loss 52.96 c.c.) and the married women (24 cases, mean loss 42.91 c.c.). In the latter group, the flow was more profuse in the parous (13 cases, mean loss 48.18 c.c.) than in nulliparous (11 cases, mean loss 36.68 c.c.).

No familial tendency was detected in the menstrual blood loss in three groups of sisters included in this study.

There was no correlation between the blood loss and the blood hemoglobin in the subjects studied. Blood hemoglobin determinations by the Newcomer method, as well as erythrocyte, leucocyte and reticulocyte counts and hematocrit determinations, were made several days after the menstrual period so as to avoid variations

TABLE II

CASE	AGE	MARRIED OR SINGLE	NUMBER OF CHILDREN	BLOOD			NAPKINS USED	DURATION OF PERIOD—DAYS	MENSTRUAL LOSS		
				ERYTHROCYTES MILLIONS	HEMATOCRIT PER CENT	HEMOGLOBIN GRAMS			IRON MG.	HEMOGLOBIN GRAMS	BLOOD C.C.
1	40	M	0	3.900	37.5	10.370	5	3	2.28	0.680	6.66
2	27	M	0	5.040	46.5	14.730	4	4	4.14	1.235	8.38
3	19	S	0	4.180	43.0	12.200	6	3	3.84	1.146	9.39
4	31	S	0	4.740	40.5	12.200	4	2	4.10	1.223	10.24
5	37	S	0	4.120	35.0	10.370	4	4	3.78	1.128	10.87
6	25	M	2	4.630	39.0	10.220	7	3	3.85	1.149	11.23
7	35	S	0	4.310	41.0	11.570	10	4	4.75	1.417	12.24
8	21	M	1	4.830	38.5	10.730	4	5	4.62	1.379	12.85
9	27	S	0	4.790	42.0	11.990	6	4	5.20	1.552	12.94
10	21	S	0	4.530	40.0	11.780	6	4	5.12	1.528	12.97
11	20	S	0	3.950	38.0	11.780	9	5	5.60	1.671	14.18
12	20	S	0	4.040	37.0	11.570	6	3	5.60	1.671	14.44
13	33	S	0	4.100	35.0	10.520	8	5	5.47	1.632	15.51
14	37	M	0	4.690	40.0	10.940	10	3	6.00	1.791	16.35
15	20	S	0	4.680	39.0	12.410	14	5	7.20	2.149	17.31
16	19	S	0	4.650	44.0	11.360	11	3	6.60	1.970	17.34
17	33	M	0	4.680	41.0	11.990	9	4	7.02	2.094	17.46
18	25	S	0	4.590	37.0	11.990	11	6	7.86	2.347	19.57
19	32	S	0	4.200	37.0	11.570	7	4	7.60	2.268	19.60
20	41	S	0	4.770	44.0	12.410	11	5	8.56	2.555	20.58
21	28	S	0	4.220	41.0	11.360	14	6	7.92	2.364	20.80
22	26	S	0	4.780	42.0	12.200	9	5	8.60	2.567	21.04
23	27	S	0	4.110	39.0	11.780	9	6	8.32	2.483	21.07
24	29	S	0	4.270	42.0	12.410	9	4	8.88	2.650	21.35
25	42	M	2	4.770	40.0	12.625	13	5	9.10	2.716	21.51
26	36	M	0	4.610	40.5	12.410	6	3	9.00	2.686	21.64
27	19	S	0	4.600	42.0	11.990	5	3	8.82	2.632	21.95
28	20	S	0	4.360	42.5	11.150	11	6	8.83	2.486	22.29
29	31	S	0	4.370	39.0	12.200	5	2	9.52	2.841	23.21
30	21	S	0	4.050	39.0	12.410	13	6	9.66	2.883	23.23
31	20	S	0	3.960	35.0	10.220	7	6	8.70	2.597	25.41
32	26	M	0	3.380	33.0	10.220	13	6	8.75	2.611	25.54
33	22	S	0	4.890	40.0	10.220	12	5	9.00	2.686	26.28
34	22	S	0	4.290	38.0	10.220	8	4	9.00	2.686	26.28
35	25	M	1	5.280	39.5	11.570	7	3	10.56	3.152	27.24
36	27	S	0	4.580	40.0	12.280	10	3	11.36	3.391	27.61
37	30	S	0	4.070	40.5	12.410	15	6	11.55	3.447	27.77
38	23	S	0	3.980	41.0	11.990	8	4	11.60	3.462	28.87
39	21	S	0	4.630	40.0	13.190	13	4	12.92	3.855	29.22
40	31	S	0	5.250	47.0	12.200	12	5	12.10	3.611	29.59
41	31	S	0	4.480	40.0	11.940	15	3	12.01	3.585	30.02
42	39	M	2	4.140	39.0	10.300	17	7	10.62	3.170	31.07
43	24	S	0	5.020	42.0	11.570	16	6	12.24	3.653	31.57
44	29	M	0	4.480	40.0	12.200	11	5	13.52	4.035	33.04
45	19	S	0	4.490	44.0	11.150	23	4	12.60	3.761	33.73
46	25	M	0	4.010	38.5	12.200	13	6	13.94	4.161	34.10
47	34	S	0	4.660	41.0	10.520	12	4	12.24	3.653	34.72
48	37	M	1	4.560	37.0	10.440	6	4	12.30	3.671	35.86
49	21	S	0	4.200	39.0	11.940	17	6	14.49	4.325	36.22
50	36	M	4	4.530	37.0	12.510	11	4	15.59	4.653	36.60
51	15	S	0	4.430	37.0	12.200	6	4	15.08	4.501	36.89
52	21	S	0	4.380	39.0	10.940	13	6	13.75	4.104	37.51
53	21	S	0	4.410	40.0	10.730	6	4	13.50	4.029	37.54
54	31	S	0	4.760	39.0	11.570	20	4	13.89	4.146	37.69
55	38	S	0	4.470	38.0	12.625	18	4	16.47	4.916	38.81

TABLE II—CONT'D

CASE	AGE	MARRIED OR SINGLE	NUMBER OF CHILDREN	BLOOD			NAPKINS USED	DURATION OF PERIOD—DAYS	MENSTRUAL LOSS		
				ERYTHROCYTES MILLIONS	HEMATOCRIT PER CENT	HEMOGLOBIN GRAMS			IRON MG.	HEMOGLOBIN GRAMS	BLOOD C.C.
56	20	S	0	4.400	39.0	11.780	12	5	15.66	4.674	39.67
57	21	S	0	3.970	38.0	10.940	12	6	14.56	4.346	39.72
58	30	M	1	5.660	42.0	13.470	9	3	18.06	5.390	40.01
59	25	S	0	4.210	39.5	12.280	16		16.70	4.985	40.59
60	27	S	0	4.960	40.0	10.810	14	5	15.00	4.477	41.41
61	19	S	0	4.640	40.0	11.780	16	5	16.80	5.014	42.56
62	25	S	0	4.430	40.0	12.200	14	4	17.76	5.301	43.45
63	31	S	0	4.180	39.0	11.360	31	5	16.64	4.955	43.61
64	19	M	0	4.770	40.0	10.220	12	6	16.48	4.919	48.13
65	21	S	0	4.040	40.0	12.200	17	5	20.00	5.970	48.93
66	18	S	0	4.540	40.0	11.570	10	3	19.40	5.790	50.04
67	29	S	0	4.610	40.5	12.200	Vaginal cup		20.70	6.179	50.64
68	19	S	0	4.500	43.0	12.910	9	4	23.32	6.970	53.98
69	37	M	2	4.890	40.0	11.590	13	5	22.54	6.728	58.05
70	25	S	0	3.790	36.0	10.370	12	4	20.48	6.113	58.94
71	29	M	2	4.500	36.0	10.220	15	6	20.87	6.229	60.94
72	38	S	0	4.690	41.0	11.380	14	6	22.05	6.582	61.48
73	28	S	0	4.710	39.0	12.200	8	3	25.20	7.522	61.65
74	26	S	0	3.920	38.0	11.360	10	5	24.18	7.217	63.52
75	21	S	0	4.230	38.0	11.570	13	6	24.66	7.361	63.62
76	24	S	0	5.150	39.0	10.620	Vaginal cup	7	22.92	6.841	63.87
77	38	M	3	4.770	39.0	11.990	15	4	25.68	7.665	63.92
78	21	S	0	4.120	38.5	10.730	13	6	24.60	7.343	68.43
79	43	M	2	4.350	42.0	12.400	Vaginal cup	5	29.68	8.859	70.17
80	31	S	0	3.920	38.5	10.940	13	5	26.10	7.791	71.21
81	25	S	0	4.320	42.0	12.500	Vaginal cup	5	28.53	8.513	74.15
82	22	S	0	4.350	39.0	12.410	12	7	32.50	9.701	78.17
83	33	S	0	4.500	40.0	11.820	Vaginal cup	5	31.25	9.328	78.91
84	19	S	0	4.560	39.5	10.520	6	5	28.50	8.507	80.86
85	28	M	0	4.040	37.0	10.220	27	6	28.32	8.447	82.65
86	22	S	0	5.050	40.5	11.990	20	4	35.72	10.662	88.92
87	25	S	0	4.125	37.0	10.520	14	5	31.35	9.358	88.95
88	21	S	0	4.670	43.0	12.200	10	3	44.55	13.298	109.00
89	24	M	0	4.380	36.0	10.370	13	4	38.13	11.382	109.75
90	22	S	0	4.040	41.0	11.150	14	4	41.65	12.432	111.49
91	38	S	0	4.400	39.0	11.990	15	6	46.00	13.432	112.02
92	19	S	0	3.870	31.0	10.730	11	6	43.09	12.862	119.86
93	20	S	0	4.500	42.0	12.200	14	6	50.18	14.979	122.77
94	23	S	0	4.010	36.0	10.570	17	6	49.50	14.776	139.79
95	41	M	1	4.660	40.0	11.990	16	5	63.34	18.907	156.85
96	23	S	0	4.260	39.0	11.990	19	5	65.45	19.537	162.86
97	27	S	0	4.070	37.0	10.730	20	6	57.78	17.546	163.52
98	25	S	0	4.430	40.0	10.520	21	7	60.75	18.134	172.37
99	19	S	0	4.110	38.5	12.200	26	5	72.76	21.719	178.02
100	33	S	0	4.870	46.0	13.190	11	4	78.96	23.570	178.69
Average				50.55	c.e.	Standard deviation			25.73	c.e.	
Median				35.88	c.e.	Mode			25.55	c.e.	

which might have occurred at that time as a result of hydremia and changes in the water balance. No significant reticulocytosis was observed in the blood immediately following menstruation. The blood hemoglobin values ranged from 10.20 (the arbitrary lower limit) to 14.74 gm. per 100 c.c. On the whole, these values, as well as those of other normal groups which we have studied, are lower than the accepted normal hemoglobin values, although our Newcomer disk has been checked repeatedly by various methods (Van Slyke, blood iron and with known solutions of hemoglobin) and has been found to be accurate.

One of the common criteria on which the physician bases his estimation of the menstrual flow is the duration of the menstrual period. Table III shows this factor in relation to the actual blood loss. It is evident that as the duration of the period increases the average blood loss increases but there are marked variations as in Case 88 where the blood loss was 109.00 c.c. in three days and in Case 42, where there was a loss of 31.07 c.c. in seven days.

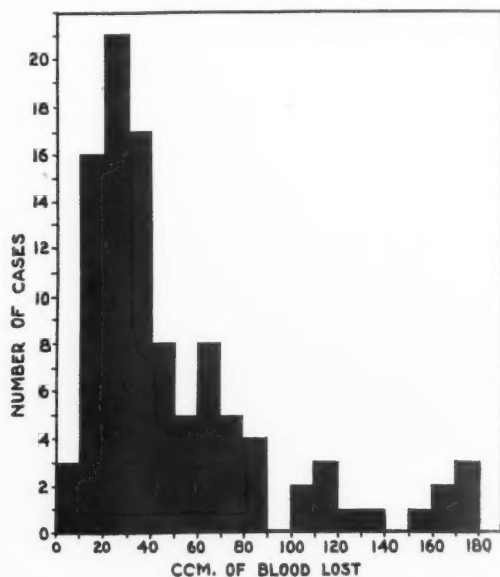


Fig. 1.

The second common criterion for judging the amount of the menstrual flow is the number of napkins which are used during the period. This is influenced not only by the amount of flow, but also by the fastidiousness and economic status of the individual. The number of napkins used by this group of women varied from 4 to 31 and in general paralleled the menstrual blood loss. Here also there were marked individual variations: Patient 15 used 14 napkins and lost 17.31 c.c. of blood, Patient 93 used the same number of pads and lost 122.77 c.c. of blood, while Patient 63 used 31 napkins and lost 43.61 c.c. of blood.

The subject's statement that her menses were normal in amount means but little since the individual, having no standard on which to base her conception of the normal menstrual loss, relies on the comparative uniformity of the menses from one period to another. The unreliability of this criterion is illustrated in this group of 100 women by the fact that neither those subjects losing a small amount nor those losing a large amount of blood were impressed by such losses. This

is further emphasized in a group of thirteen of these women upon whom studies were made during two or more periods. It is to be noted (Table IV) that a wide variation in the blood loss actually was present in several instances even

TABLE III

DURATION OF PERIOD (DAYS)	NUMBER OF CASES	MENSTRUAL BLOOD LOSS, C.C.	
		VARIAION	AVERAGE
2	2	10.24- 23.21	16.72
3	15	6.66-109.00	24.30
4	27	8.38-178.69	44.48
5	26	12.85-178.02	58.14
6	24	19.57-163.52	58.66
7	4	31.07-172.37	86.37

Showing the relationship between duration of the period and the menstrual blood loss. The highest and lowest values are given for each group.

TABLE IV

CASE	AGE	BLOOD HEMOGLOBIN GRAMS	MENSTRUAL BLOOD LOSS		
			IRON MG.	HEMOGLOBIN GM.	SUBJECT'S BLOOD C.C.
1	20	11.780	5.60	1.671	14.18
		11.990	5.74	1.713	14.28
2	20	11.150	8.33	2.486	22.29
		10.940	6.66	1.985	18.14
3	27	12.280	11.36	3.391	27.61
		12.170	17.98	5.367	44.10
4	23	11.990	11.60	3.462	28.87
			21.08	6.292	52.47
5	38	10.705	22.05	6.582	61.48
			12.80	3.820	31.38
6	37	11.790	22.54	6.728	58.05
		14.030	15.34	4.579	32.63
7	31	11.300	13.89	4.146	37.69
		12.625	18.13	5.411	42.85
8	43	12.513	29.68	8.589	70.17
		11.380	17.78	5.307	46.63
		13.470	27.23	8.725	64.77
9	19	10.730	43.09	12.862	119.86
		12.910	22.12	6.602	51.14
		12.910	39.62	11.825	91.59
10	38	11.990	46.00	13.432	112.02
		11.990	26.13	7.798	65.03
		11.820	36.40	10.865	90.61
		10.940	21.25	6.343	57.97
11	33	11.820	31.25	9.328	78.91
		11.780	25.56	7.635	64.81
12	23	11.990	65.45	19.537	162.86
		11.990	38.72	11.558	96.39
13	27	10.730	57.78	17.546	163.52
		10.220	110.58	33.008	307.62

Showing the variation in the menstrual blood loss in repeated periods in the same individual. In compiling the data for Table II only the first period analyzed on each of the subjects was included. For this reason the highest loss in Case 13 (307.62 c.c.) does not appear in the series of 100 cases.

though it went unnoticed by the subject. Most of these patients showed only a moderate variation although in Cases 9, 10, 12 and 13, one would expect the difference to be subjectively apparent.

While the menstrual loss has been reduced to terms of cubic centimeters of blood to give a more graphic description of the results, it is not the volume per se but the hemoglobin and iron content of the menstrual flow which is of vital importance. The loss of 2.28 mg. of iron per period (Case 1) would require a daily iron storage of 0.08 mg. to replace this loss alone. A menstrual loss of 78.90 mg. which was found in Case 100 necessitates a positive iron balance of 3.29 mg. of iron for each day of her regular twenty-four-day cycle. The results of iron balance studies, which are to be reported later, indicate that the latter amount is far greater than the average daily iron retention and may be attained only by the administration of iron in addition to that obtained from the diet. This continuous excessive iron loss may account for certain cases of hypochromic anemia which have been considered as idiopathic in origin. While this may not be the only etiologic factor in all such cases, it undoubtedly plays an important and frequently an unrecognized rôle.

One is not justified in setting definite limits on what may be considered as the normal menstrual blood loss, but it is significant that 50 per cent of this representative group of women lost between 23.21 and 68.43 c.c. of blood. The smallest amount, 6.55 c.c., is far below the average and, in that sense, is abnormal. The same is true of those with the greater blood losses and although a careful examination revealed nothing to account for the excessive flow, they can hardly be considered as normal. It seems probable that such large menstrual losses would have a deleterious effect on the hematopoietic system if long continued.

SUMMARY

The menstrual blood loss in 100 apparently normal women ranged from 6.55 c.c. to 178.69 c.c. with an average of 50.55 c.c. Fifty per cent of these women lost between 23.21 c.c. and 68.43 c.c.

The duration of the period and the number of napkins used give only a vague idea of the amount of menstrual flow.

The effect of this loss of iron on the hematopoietic system is considered briefly.

REFERENCES

- (1) Osgood, E. E., Haskins, H. D., and Trotman, P. E.: *J. Lab. & Clin. Med.* 17: 859, 1932.
- (2) Reis, F., and Chakmakjian, H. H.: *J. Biol. Chem.* 92: 59, 1931.

THE ROENTGENOTHERAPY OF CHORIONEPITHELIOMA

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CHORIONEPITHELIOMA is an exceedingly rare tumor with grave malignant potentialities. Derived from tissues of the embryo it represents a parasitic growth alien to the maternal tissues in which it grows so luxuriantly. It usually follows gestation immediately or remotely. In the large majority of cases, well over 80 per cent, the preexisting pregnancy is distinctly abnormal. In over half the cases this pregnancy resulted in a hydatidiform mole. This association between mole and chorionepithelioma is exceedingly noteworthy for few malignancies are so intimately associated with a preexisting, relatively benign condition. The extensive proliferation of chorionic tissue in hydatidiform mole, occasionally resulting in actual invasion of the uterine wall, more than favors the similar but more extensive process seen in chorionepithelioma.

Abortion preceded the development of the malignant tumor in over 30 per cent of a large group of collected cases. In rare instances the condition occurred at the site of an ectopic gestation. Although a large number of cases have followed normal gestations at term, in the majority of instances a pathologic pregnancy has antedated the development of the chorionepithelioma.

The origin of the newgrowth being the chorionic epithelium of the fetal villi, the location of the primary tumor is usually in the region of the placental site. Thus, in most instances, the cavity of the uterus is soon filled by the proliferating neoplasm. It is apparent that in cases of placenta previa where villi are abundantly present in the region of the cervical os, this area could be the site of the primary tumor; however, no such cases have been reported. In the literature, however, a number of cases have been described where the first growth was discovered in the vagina, on the labia or in a distant organ. These, however, were probably metastatic growths transported from an original focus at the placental site. This original focus could have undergone complete necrosis due to the peculiar characteristics of the growth.

Arising from the epithelial coverings of villi the cytology of the tumor can be very variable and bizarre. The growth may be chiefly composed of large, multinucleated masses of syncytium. These masses of protoplasm are riddled with vacuoles of various sizes. The nuclei may

be small, dark staining or large, clear and vesicular. There are masses of small, well-defined, polyhedral cells with large nuclei whose origin from the Langhans' cells is quite apparent. These two cellular elements vary in proportion in different tumors. Last, there are present varying numbers of intermediate cells, mononucleate and multinucleate, which have dark staining nuclei and infiltrate the tissues widely. Their origin from either layer of chorionic epithelium is not apparent, there being a marked variation in size, shape, and maturity of the cells. These component cell masses are held together by extensive hemorrhagic extravasations and necrotic tissue. The large amount of fibrin and blood is due to the peculiar ability of syncytium to invade blood vessel walls, disintegrating their continuity and leading to hemorrhagic extravasation. The extensive amount of necrosis in the tumor cells is the result of rapid proliferation of tissue without adequate blood supply. The tumor tissue is truly parasitic in that it lacks a stroma of its own and a blood supply of its own, surviving and proliferating by its ability to tap the host's circulation for sustenance. Because of these characteristics, tumor nodules can, and probably do, become completely encapsulated by necrotic tissue, fibrin, etc., thereby losing their source of blood supply and undergoing complete necrosis. This may explain the rare cases of cure in inoperable cases reported in the literature.

Chorionic epithelium probably elaborates the so-called anterior pituitary-like hormone which is responsible for the hormonal test of pregnancy. Where there is present such a pathologic overgrowth of chorionic epithelium as seen in chorionepithelioma, the hormonal excretion in the urine and its concentration in the blood should be very high. The high concentration of this hormone in the urine offers an excellent diagnostic test for the presence of this tumor; the continued presence of the hormone indicates a lack of complete eradication; its recurrence likewise indicates metastatic growths. Thus the character of the growth itself has provided us with the best diagnostic aid for the recognition of the primary tumor and a warning signal for possible recurrences and metastases. Several weeks after complete disappearance of chorionic epithelium the pregnancy test becomes negative and remains so.

The excessive hormonal influence on the ovaries often leads to a stimulation of follicle growth and excessive luteinization of these follicles. The ovaries are often replaced by large cystic growths which consist of multiple lutein cysts. The cyst walls have the characteristic yellowish color. These cystic tumors undergo rapid retrogression following the removal of the chorionic tissue, the ovaries often returning to the normal size in six or eight weeks.

The following case is being presented because it is unique in many features. Furthermore, the therapy used probably offers considerable as an aid in the successful treatment of chorionepithelioma.

Mrs. J. (Unit No. 107771.) The patient, aged twenty-six, was married previously and divorced. In July, 1931 she had a spontaneous abortion of a two months' gestation, following which a dilatation and curettage were performed for bleeding. While at the hospital she developed acute appendicitis and at laparotomy the appendix, right ovary and a portion of the left ovary were removed. This was done for multiple follicle cysts of the ovaries.

The present marriage occurred two years ago. Her last normal menstrual period was in December, 1933. During the first week in January she had a rather sudden

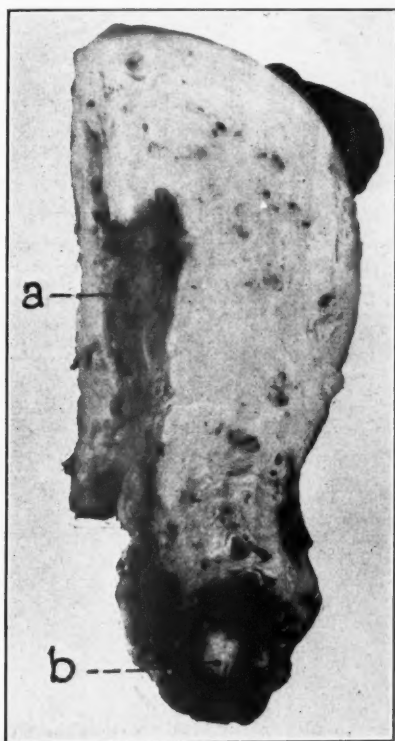


Fig. 1.—The chorionepithelioma can be seen completely replacing the cervix and invading the bases of the broad ligaments. The fundus is free of tumor tissue. (a) Chorionepithelioma. (b) Placental site.

and profuse vaginal hemorrhage. She bled again on Jan. 18, 1934 and considered this bleeding to be her normal menses. No further vaginal bleeding occurred until April 15. During this interval she complained of nausea and morning vomiting. She was examined by her physician on March 12, and he suggested that she might be pregnant. About April 15 she began to bleed and continued to do so intermittently. She used two or three pads daily. Occasionally there would be a profuse sudden gush of bright red blood, particularly when she was unusually active. In May she developed a pain in the left lower quadrant of the abdomen. Because of her continuous bleeding and this sudden attack of pain she was examined by several physicians who attempted to rule out an ectopic gestation. A Friedman test at this

time was positive. Because of the fact that the corpus of the uterus was enlarged to the size corresponding to the duration of the amenorrhea a diagnosis of an intra-uterine gestation, possibly with a fibroid tumor complicating it, was considered most likely.

The latter part of June the patient began to bleed more profusely. She developed rhythmic contractions in the lower abdomen resembling labor pains. She likewise developed cough and fever. She was hospitalized and medical induction was attempted. She continued to bleed profusely and her temperature rose to 104° F. She had several chills. During this time she passed several large, foul-smelling blood clots.

When the author saw the patient for the first time she had been in labor for several days. At this time she was in active labor, good strong pains recurring every two or three minutes. There was a continuous bloody discharge from the



Fig. 2.

Fig. 2.—A section of the normal placenta. ($\times 22$)

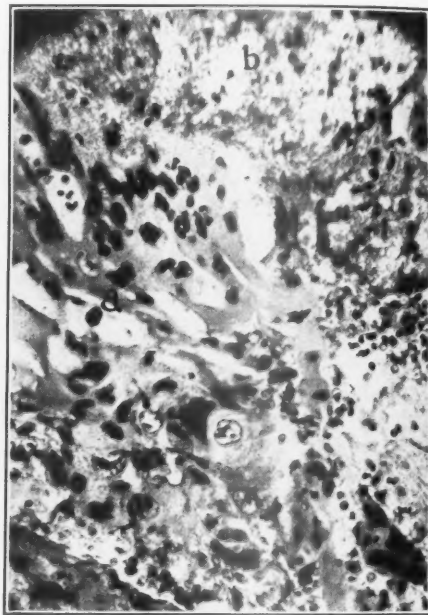


Fig. 3.

Fig. 3.—Chorionepithelioma. A mass of syncytium. (a) Note the large mass of multinucleated cytoplasm—greatly vacuolated. (b) Hemorrhage. ($\times 450$)

vagina. The temperature was 104° and the pulse 140. On vaginal examination the cervix was found to be completely dilated and effaced, and there was a soft, spongy, friable mass filling the os. Further examination to determine the extent and character of this mass resulted in profuse bleeding. It was thought that this mass was a centrally located placenta previa. An attempt was made to break through this in order to rupture the membranes and deliver the baby. This was difficult because in peeling away the soft, friable, spongy tissue from the cervix, portions of the cervical tissue came away with it. Finally the membranes were located, ruptured, and a fetus of approximately six months was delivered. The skin on the fetus was macerated and peeled off in large fragments. In spite of this the fetus was alive and lived for over an hour.

The patient continued to bleed profusely and the uterine cavity was explored. The normal placenta was located high in the fundus and could be separated and

removed easily. A soft, friable, boggy mass was found occupying the entire lower uterine segment and intimately a part of it. The uterus, lower uterine segment, and vagina were thoroughly packed, and the patient was allowed to rally. At this time she appeared to be in extreme shock as a result of the great amount of blood which she had lost during the delivery. She was given a transfusion immediately and on many occasions after this. The uterine pack was removed the following day, whereupon she again began to bleed. She continued to bleed in spite of a second attempt at vaginal tamponade. She likewise continued to run a septic course.

On July 14 she was transferred to the Chicago Lying-in Hospital. After a liberal blood transfusion the lower uterine segment and uterus were carefully explored. A large crater replaced most of the lower uterine segment and extended up into the region of the bases of the broad ligaments, most marked on the right side. Friable necrotic tissue could be removed with ease. The destructive growth

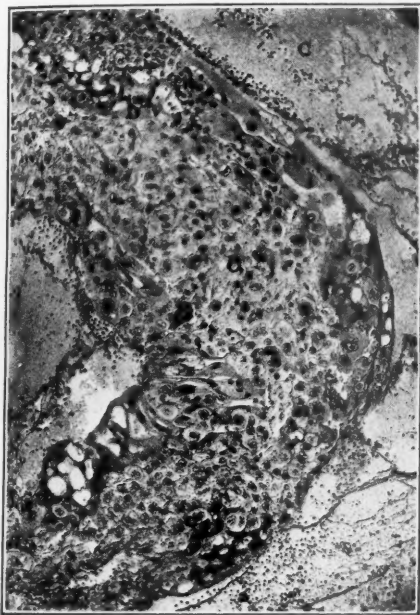


Fig. 4.

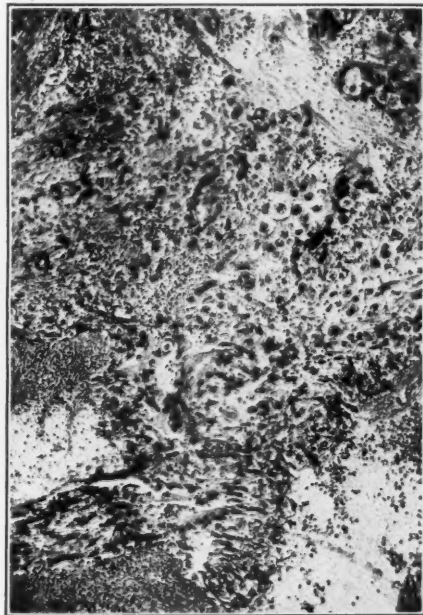


Fig. 5.

Fig. 4.—Chorionepithelioma. (a) A mass of Langhans' cells, varying considerably in size. (b) Note also deep-staining masses of syncytium at periphery of this island. (c) The large amount of blood and necrotic tissue is typical of this tumor. ($\times 125$)

Fig. 5.—Chorionepithelioma showing cells derived from Langhans' and syncytial layers as well as intermediate cells infiltrating the fibromuscular tissue of the cervix. (a) Myometrium. ($\times 125$)

seemed to be limited to the lower uterine segment and lower parametria and did not extend into the corpus. An attempt was made to clamp the uterine arteries with Henkel's clamps, but this did not control the bleeding. The patient continued to run a septic course with high temperature and rapid pulse.

On July 19, after the patient appeared to be going rapidly downhill because of continued bleeding, a laparotomy was performed. The patient was first prepared for this by two liberal blood transfusions. The uterus was found to be several times the normal size and in a typical puerperal state. Extensive induration was present in the region of both broad ligaments so that the entire cervix and uterus appeared fixed. A mass could be felt occupying the right broad ligament. The corpus was removed supravaginally along with the adnexa. In cutting across the right

broad ligament and cervix, tumor tissue could be seen infiltrating the structures throughout. It was entirely impossible to consider removal of the cervix because of the extent of the growth. Bleeding was controlled and the stump peritonized.

Following the operation she had a stormy course for a week or so, after which she improved daily. The temperature and pulse subsided rapidly to normal. She had some slight vaginal bleeding of little consequence. Radiation was started on August 1, twelve days postoperatively. It was continued with only slight interruptions for thirty-seven days. She was finally discharged from the hospital on her fifty-fourth postoperative day.

During a period of six weeks the patient received 11 transfusions totaling 7,000 c.c. of blood. Thus her total blood volume was replaced about $1\frac{1}{2}$ times. The lowest hemoglobin content was 4 gm. per kilogram of body weight on July 16.

Aschheim-Zondek tests were markedly positive throughout the course of this disease. The first negative test occurred on Sept. 7, 1934. Since that time frequent tests have proved to be negative, the quantitative amount of anterior pituitary-like

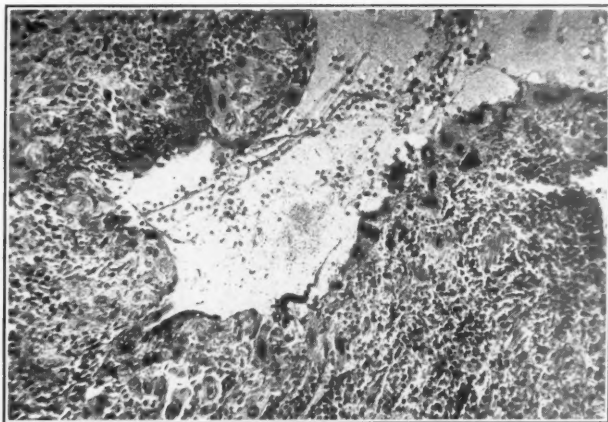


Fig. 6.—Chorionepithelioma. The wall of the venous channel has been largely replaced by invading chorionic tissue showing the tendency of chorionic epithelium to invade the circulation. ($\times 225$)

hormone being carefully determined biologically. The following is a record of the Aschheim-Zondek tests. The hormone was separated from the urine by the Zondek precipitation method.

DATE	AMOUNT OF URINE USED	RESULT
July 18, 1934	0.25 c.c.	++
Aug. 1, 1934	1 c.c.	++
Aug. 11, 1934	2 c.c.	+
Aug. 22, 1934	8 c.c.	+
Sept. 7, 1934	8 c.c.	—
Oct. 2, 1935	8 c.c.	—
Jan. 5, 1935	20 c.c.	—
July 19, 1935	20 c.c.	—
Nov. 1, 1935	20 c.c.	—

X-ray examination of the lungs, bones, etc., showed no metastases. The patient was seen at frequent intervals following her discharge from the hospital. At her last visit, Nov. 1, 1935, the patient appeared to be in excellent health. She had gained 10 kilograms in the previous six months. She complained of a few symptoms referable to the menopause such as tachycardia, hot flushes, and nervousness. There

was no bleeding whatsoever. On examination postmenopausal changes were present in the vulva and vagina. The vaginal epithelium was smooth and glistening and showed some superficial ulcerations and petechial hemorrhages. This was undoubtedly due to a postmenopausal vaginitis brought on by the radiation. The cervical stump was atrophic, smooth, and well suspended in the vault and fairly movable. No induration or tenderness was present in either parametrial region. She was placed on amniotin suppositories after which the symptoms referable to the postradiation vaginitis disappeared.

Pathology.—The gross and microscopic pathology is best illustrated by Figs. 1 to 6 and their legends.

DISCUSSION

This case of chorionepithelioma presents several interesting features worthy of discussion. The occurrence of this malignant tumor in the presence of a normal gestation with a living baby has not been previously reported. It is not unlikely that this newgrowth developed simultaneously with the growth of the fetus. The history of continued bleeding for some months and the extent of the growth would give evidence to this statement. It is true that many of these tumors first make themselves evident in the immediate postpartum period. Although it has been felt that they begin their growth at the termination of the gestation and grow rapidly, it is entirely possible that they begin their malignant growth during the latter part of the gestation.

In normal pregnancy chorionic epithelium invades the uterine wall extensively. This normal proliferation is most marked at the placental site. Furthermore, normal chorionic tissue, including entire villi, is transported to distant parts of the body where it may continue to survive indefinitely. It is interesting to speculate on the mechanism by which these invading cells are kept from undergoing abnormal proliferation. That this mechanism fails so rarely is, indeed, a most interesting observation. That this mechanism fails most often in cases of abnormal gestation, such as hydatidiform mole and abortion, suggests the possibility that a disordered hormonal influence, such as might occur in such gestations, promotes an abnormal proliferation of chorionic epithelium. The borderlines between a normal process seen in the physiologic proliferation of chorionic epithelium in normal pregnancy and the most malignant process of chorionepithelioma are nowhere closer.

The location of the tumor is unusual and gave rise to a confusing clinical picture at the time of delivery. The tumor filled the entire lower uterine segment, completely covering the os. Its soft, spongy, friable, bloody character so closely simulated a central placenta previa that it was mistaken for it. The invasive and destructive character of the growth and the presence of the normal placenta high in the fundus revealed the true nature of the complication. However, placenta previa accreta was considered in the diagnosis.

Usually, chorionepithelioma arises at the site of the placenta, probably because of the marked chorionic proliferation normally present in this region. A number of cases have been reported in which the only growth discovered was present in the vagina or on the labia or in some distant organ. It was always felt that these tumors represented metastatic foci from a primary growth in the uterine cavity. The site occupied by this growth, some distance from the normal placenta, would indicate that chorionic epithelium could undergo abnormal proliferation in any locality provided that the stimulus for abnormal growth was present.

TREATMENT

The treatment of this case is interesting. Too few of these cases are seen in any one clinic to allow the development of a standard therapy. The treatment of every case adds to the accumulated knowledge. It has long been the impression of those interested in radiation therapy that chorionepithelioma should rank among the most radiosensitive neoplasms because of its rapid growth and embryonic cell type. In the recent literature there are a few reports of the irradiation treatment of chorionepithelioma carried out in conjunction with operation. All observers are agreed that following irradiation the visible or palpable tumor masses regressed very rapidly.

The roentgenotherapeutic technic employed in the case cited above was as follows:

Voltage 200,000	Ma. 3	Filter $1\frac{1}{2}$ mm. Ca + 2 mm. Al.
Focal skin distance 50 cm.		

Four pelvic portals 15 by 15 cm. were demarcated, the beam directed through each portal to converge upon the site of the uterus and upper vagina.

A fifth perineal post, 15 by 15 cm., with the beam directed upward into the pelvis was also employed after the irradiation through the pelvic portals was completed.

One treatment a day per portal was given, the dose being 242 r. measured in air. The pelvic portals were treated in rotation until each portal had received a total of eight treatments. The series was then completed by three treatments of 242 r. each to the pelvic portal.

Period of irradiation = 37 days.
Total dose measured in air = 8,712 r.
Skin dose (backscatter factor = 0.3) = 11,225 r.
Estimated tumor dose (30% at 10 cm.) = 3,740 r.

The irradiated skin developed a moderately severe reaction, deep erythema and superficial excoriation in the centers of the portals. A typical "radio-epithelite" of Coutard did not develop. Burning in the rectum and pain referred to the urinary bladder were rather severe

during the last several days of treatment. Two weeks after cessation of treatment the skin was completely healed but deeply pigmented.

The operative procedure in this case was done only to control hemorrhage by ligation of vessels at some distance from the growth. In amputating the corpus it was necessary to cut across tumor tissue which had replaced most of the cervix and parametria, particularly on the right side. Histologic sections from the growth left behind in the cervix and parametria showed the invasive chorionic epithelium. The extensive course of radiation was given because of the wide extent of the growth.

The treatment of this case was so satisfactory that radiation therapy should be considered in every case of chorionepithelioma. In operable cases where the entire growth can be removed easily, operation is probably the method of choice. However, it should be preceded or followed by a thorough course of radiation. In the inoperable case or for the treatment of metastatic growths, adequate radiation offers the best prognosis. It must be remembered that when radiation is resorted to, it must be pushed to the limit of tolerance of the patient.

Frequent blood transfusions probably saved this patient's life. The various procedures undertaken could not have succeeded without resort to liberal transfusions. During the course of the radiation treatment blood transfusions maintained the patient's blood in good condition despite the destructive action on the blood by the radiation therapy.

REFERENCES

- Beach, R. M.: *AM. J. OBST. & GYN.* 27: 782, 1934. Brindeau, A., Hinglais, H., and Hinglais, M.: *Presse méd.* 43: 1017, 1935. Ewing, James: *Neoplastic Diseases*, ed. 3, Philadelphia, 1931, W. B. Saunders Company. Eymer, H.: *Strahlentherapie* 44: 241, 1932. Gál, F.: *Strahlentherapie* 47: 322, 1933. Gostimirović, D.: *München. med. Wehnschr.* 79: 629, 1932. Keller, R.: *Gynéc. et obst.* 25: 440, 1932. Leventhal, M. L., and Saphir, W.: *J. A. M. A.* 103: 668, 1934. Lynch, Frank W., and Maxwell, Alice F.: *Pelvic Neoplasms, Gynecological and Obstetrical Monographs*, X, New York, 1931, D. Appleton & Company. Machado, L. M.: *Rev. de gynéc. e d'obst.* 29: 206, 1935. Mathieu, A., and Palmer, A.: *Surg. Gynec. Obst.* 61: 336, 1935. Sunde, Anton: *Chorionepithelioma Malignum*, Kristiania, 1920. Teacher, John H.: *A Manual of Obstetrical and Gynaecological Pathology*, London, 1935, Oxford University Press.

Hagaman, Frank: *Resection of the Presacral Nerve for Relief of Pelvic Pain*, New Orleans M. & S. J. 88: 339, 1935.

Hagaman reports 17 cases in which the operation was done. There were 15 successful results. The 2 failures were ascribed to improper selection of cases for the operation. The procedure is comparatively simple of execution and no ill effects have been observed following the operation. The author states that resection of the presacral nerve relieves dysmenorrhea characterized by pain in the uterus, urinary bladder, rectum, anus, coccyx, and possibly the vagina. Pain in other regions is not influenced by the neurectomy.

EUGENE S. AUER.

STATISTICAL STUDIES ON PUERPERAL INFECTION

III. AN ANALYSIS OF 115 DEATHS DUE TO PUERPERAL INFECTION

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IN TWO preceding communications (this JOURNAL, 31: 435 and 582, 1936), the author presented in detail the results of a statistical survey of a large series of cases of puerperal infection and drew attention to certain factors influencing the frequency of this serious obstetric complication. Subsequently it seemed advisable to investigate in a similar manner a group of fatal cases of such infection in order to determine the mortality rates and to ascertain the presence of any factors having an unfavorable effect on the prognosis. The results of this study form the content of this paper which is based on the case records of 115 patients dying of puerperal infection on the Obstetrical Service of the Johns Hopkins Hospital from the time of its inception in 1896 to the end of 1930. In order that the series should be as complete as possible, we have included not only deaths occurring in those patients delivered at term or prematurely on the Hospital or Outdoor Services, but also all cases of abortion, as well as a number of women admitted because of clinical evidences of infection following delivery by some outside physician or midwife. Only those cases have been included in which the clinical cause of death seemed obviously to be infection; and in most instances the diagnosis was confirmed at autopsy.

Table I indicates the gross statistics of the series according to type of admission and also the mortality rates derived. The gross maternal mortality due to puerperal infection, and based on a total of 33,918 admissions, both hospital and home, was 0.339 per cent or 1 in 295 admissions. It will be noted that this rate is heavily weighted in the rubrics "admitted postpartum" and "deliveries, abortion." All of the former and most of the latter admissions were in patients who had never received antenatal care on the service but who came to the hospital or were referred to it by some outside physician because of an already existing abnormality, frequently infection. Emergency patients of this type, often owing their abnormal condition to negligent care on the part of physician, midwife, or abortionist, make up the majority of deaths due to infection in this and most other recorded series. It is obviously unfair to assume that the infection causing the fatal outcome can be charged to the Clinic, since an already symptomatically severe intrauterine process is usually the reason for hos-

pitalization. Direct clinic responsibility should be assumed only in those cases followed throughout their entire course, the registered or "booked" patients delivered by the service. Table I indicates that

TABLE I. GROSS STATISTICS AND MORTALITY RATES OF SERIES

	TOTAL CASES			DEATHS—INFECTION		
	HOUSE	O. O. S.	TOTAL	HOUSE	O. O. S.	TOTAL
Deliveries at term	17,099	12,128	29,227	33	5	38
Deliveries, premature	1,224	730	1,954	9	0	9
Deliveries, abortion	1,718	413	2,131	22	1	23
Admitted postpartum	570	1	571	45	0	45
Died undelivered	34	1	35	0	0	0
Totals	20,645	13,273	33,918	109	6	115
	CASES		DEATHS	INCIDENCE		
Deliveries at term, registered	26,034		25	0.096% or 1 in 1,042 del.		
Deliveries, premature, registered	1,450		4	0.276% or 1 in 362 del.		
Total deliveries, registered	27,484		29	0.106% or 1 in 943 del.		
Deliveries at term, total	29,227		38	0.130% or 1 in 769 del.		
Deliveries, premature, total	1,954		9	0.461% or 1 in 217 del.		
Deliveries, abortion, total	2,131		23	1.079% or 1 in 93 del.		
Admitted postpartum	571		45	7.881% or 1 in 13 adm.		
Died undelivered	35		0			
Grand total	33,918		115	0.339% or 1 in 295 adm.		

the infection death rate in registered patients delivered at or near term was 0.106 per cent or 1 in 943 deliveries, and including only term patients fell to 0.096 or 1 in 1,042 deliveries. We believe that these figures indicate the basal mortality risk from puerperal infection which is unavoidable in the light of present obstetric knowledge. Williams stated in 1930 that for the country at large deaths from infection totaled between 2 and 3 per 1,000 births, and it seems reasonable to assume that a half to two-thirds of them should be termed avoidable.

That peritonitis is the chief cause of death in cases of puerperal sepsis is shown by Table II, this condition being present clinically

TABLE II. CAUSE OF DEATH (PERCENTAGE OF TOTAL DEATHS)

	TERM	ABORTION	TOTAL
Peritonitis	42.42	44.90	43.38
Peritonitis and septicemia	9.09	10.20	9.57
Peritonitis and thrombophlebitis	4.55	8.16	6.09
Thrombophlebitis	7.58	12.24	9.57
Thrombophlebitis and septicemia	1.52	0.00	0.87
Septicemia	25.76	22.45	24.35
Type not clear (no autopsy)	9.09	2.04	6.09

(and in most instances confirmed by autopsy) in 59 per cent of those patients who succumbed. A terminal septicemia or some thrombophlebitic involvement was often present as a complicating factor but peritonitis seemed to be the predominant condition. Thrombophlebitis was present in a sixth of the total cases but seemed the main reason

for the fatal outcome in only a tenth; while septicemia occurred in 35 per cent and was the sole factor in 24 per cent of the series. In a few isolated cases the lesion, although clinically puerperal sepsis, could not be accurately determined; and since autopsy was not obtained these deaths have been listed as "type not clear."

By way of further analysis of these fatal instances of puerperal infection certain items have been obtained from the case records and comparisons made between the total deaths and deaths due to peritonitis, septicemia, or thrombophlebitis. Moreover, for purposes of comparison, the 500 cases of puerperal infection analyzed in the second article of this series have been included and, as a normal control, the general clinic population. The following factors have been selected for analysis and comparison: (The percentages to be presented include only those patients dying after a pregnancy of seven or more months' duration. The abortion figures will be presented elsewhere.)

1. *Race, Age, and Parity.*—It has frequently been pointed out that the incidence of puerperal infection is higher in the black than in the white race. Table III indicates further that the prognosis in this condition is somewhat more serious in the black patients since they disproportionately outnumber the whites even more in the fatal cases of puerperal infection than in the nonfatal ones. There is also a peculiar racial difference according to cause of death, four-fifths of the fatalities due to peritonitis and thrombophlebitis occurring in the black race, while more than half of the fatal septicemias occurred in white patients. Table III would also seem to demonstrate that puerperal

TABLE III. DEATHS AT OR NEAR TERM

	TOTAL CLINIC POPULA- TION	500 CASES INFECTION	DEATHS INFECTION	DEATHS PERITONITIS	DEATHS SEPTICEMIA	DEATHS THROMBO- PHLEBITIS
	PER CENT	PER CENT	PER CENT	PER CENT	PER CENT	PER CENT
<i>Race:</i>						
White	47.75	38.40	34.85	21.43	52.94	20.00
Black	52.25	61.60	65.15	78.57	47.06	80.00
	YEARS	YEARS	YEARS	YEARS	YEARS	YEARS
<i>Age:</i>						
Mean	23.86	22.32	26.73	26.07	28.44	31.50
	PER CENT	PER CENT	PER CENT	PER CENT	PER CENT	PER CENT
<i>Parity (omitting unknown):</i>						
Primiparas	35.87	72.66	30.51	20.83	33.33	25.00
Multiparas	64.13	27.34	69.49	79.17	66.67	75.00

infection is a more serious complication in multiparous than in primiparous women. Thus, although nearly three-quarters of the patients forming the total infection group had been delivered of their first

child, more than two-thirds of the fatal cases were multiparas. No essential difference in parity was noted according to cause of death although the highest primiparous incidence was in the septicemia group and the lowest when the fatal issue was due to peritonitis. It has been remarked previously that the highest incidence of puerperal infection is found in women in the earlier ages of their childbearing careers. However, the figures in this study would tend to indicate a more serious prognosis with advancing age, and the mean age of the women dying was four and a half years more than that of the total cases of infection and three years more than the general clinic population. According to cause of death the youngest patients were in the peritonitis death group and the oldest in the thrombophlebitis.

2. *Type of Delivery.*—The policy of the Johns Hopkins Clinic has always been one of strict conservatism. Thus, despite the extreme frequency of contracted pelvis observed on the service, there occurs an incidence of perineal operative deliveries of approximately 14 per cent and of cesarean sections 3 per cent. This perineal operative delivery and cesarean section rate becomes much increased in the puerperal infection series and together reaches 31 per cent. The increased likelihood of severe infection resulting from operative manipulation is shown in Table IV, and it will be seen that less than half of the deaths due to infection occurred following spontaneous delivery despite the

TABLE IV. INFLUENCE OF TYPE OF DELIVERY

	TOTAL CLINIC POPULA- TION PER CENT	500 CASES INFECTION PER CENT	DEATHS IN- FECTION PER CENT	DEATHS PERITO- NITIS PER CENT	DEATHS SEPTI- CEMIA PER CENT	DEATHS THROMBO- PHLEBITIS PER CENT
<i>Delivery (omitting postpartum)</i>						
Spontaneous	82.96	68.99	44.68	42.86	50.00	33.33
Operative	13.88	18.90	31.91	23.81	41.67	66.67
Cesarean section	3.16	12.11	23.40	33.33	8.33	0.00

fact that they comprised 83 per cent of the total deliveries. Twenty-three and four-tenths per cent of the fatal cases of puerperal infection occurred following abdominal delivery and in most instances peritonitis was the terminal feature. It should be noted in passing that of the eleven section deaths among women delivered by the service only five were in registered patients, the others being admitted with obstructed labor and intrapartum infection following supervision by some outside agency. Moreover, 72 per cent of the deaths occurring in registered patients followed spontaneous delivery, and the Clinic has been fortunate enough not to lose a single registered patient from infection following low forceps or breech extraction.

3. *Intrapartum Infection*.—There is a tendency to consider only the immediate danger of intrapartum infection and to disregard its subsequent implications. Our figures indicate that frequently such a process progresses during the puerperium to a fatal issue. This may best be emphasized by three figures from Table V indicating an inci-

TABLE V. INTRAPARTUM INFECTION

	TOTAL CLINIC POP- ULATION	500 CASES IN- FECTION	DEATHS IN- FECTION	DEATHS PERITO- NITIS	DEATHS SEPTI- CEMIA	DEATHS THROMBO- PHLEBITIS
<i>Intrapartum Inf.</i> Per cent of total delivered	3.82%	9.36%	34.85%	23.81%	58.33%	100.00%

dence of intrapartum infection of 3.82 per cent in the general clinic population, one of 9.36 per cent for the group of patients with puerperal infection, and one of 34.85 per cent in the series of deaths.

4. *Uterine and Blood Cultures*.—Table VI shows the incidence of pathogenic organisms obtained from 771 positive intrauterine cultures taken as a matter of routine in cases of puerperal infection, which may be contrasted with results similarly obtained in the fatal cases of infection. It will be noted that almost half of the streptococci in the death column are listed as "undifferentiated" and it should be explained that these cases occurred in the earlier days of the Clinic when crude bacteriologic technic did not offer an exact method of differentiation. Table VI emphasizes the serious import of intrauterine

TABLE VI. UTERINE CULTURE. PERCENTAGE OF TOTAL CULTURES (SEVEN HUNDRED SEVENTY-ONE POSITIVE CULTURE REPORTS)

	PUERPERAL INFECTION	DEATHS INFECTION
Hemolytic strep.	8.56	25.64
Aerobic nonhemolytic strep.	26.20	7.69
Anaerobic strep.	42.80	10.26
Undifferentiated strep.	0.00	38.46
<i>Strep. viridans</i>	1.17	2.56
Total strep.		78.73
<i>Staph. albus</i>	26.07	10.26
<i>Staph. aureus</i>	3.25	12.82
Total staph.		29.32
<i>B. coli</i>	9.08	17.95
<i>B. welchii</i>	0.65	15.38
Gonococcus	1.23	2.56

infection due to the hemolytic streptococcus and also the viridans, whereas the anaerobic and aerobic nonhemolytic varieties, although found much more frequently, carry a more favorable prognosis. Some variety of streptococcus was found in five-sixths of the fatal cases. Furthermore, the staphylococcus aureus was obtained by culture four

times as often in the fatal cases as in the general experience with puerperal infection and a number of instances of fulminating *Staph. aureus* septicemia occurred. It has frequently been said that the colon bacillus, although relatively innocuous by itself, possesses the ability to augment the pathogenic character of other invasive bacteria, and our findings confirm this dictum since the incidence of this organism was almost twice as great in the fatal as contrasted with the total cases of infection. A surprising result was the incidence of 15.38 per cent of *B. welchii* in cultures obtained from fatal cases. Furthermore, a number of instances of septicemia due to this organism occurred, particularly in the early days of the Clinic. No particular attempt was made to culture the gonococcus in the series, and it is felt that the incidence of this type of infection was actually much higher for the nonfatal clinic group. The total number of cultures in the series of deaths was too small to permit division according to type of pathologic reaction, but it may be said that the hemolytic streptococcus predominated in the septicemia group and the anaerobic variety in the thrombophlebitis series. Likewise, the number of positive blood cultures obtained on patients dying was too few for complete analysis, and we present merely the following incidence groups: hemolytic streptococci 50 per cent, other streptococci 25 per cent, staphylococci 15 per cent, and *B. coli* and *B. welchii* 10 per cent each.

5. *Course of Infection.*—As has already been stated, labor was complicated by intrapartum infection in 34.85 per cent of the fatal cases. Omitting these patients, together with five others in whom many of the historical details were lacking, it was found that fever had manifested itself within forty-eight hours of delivery in 50 per cent and within ninety-six hours in 82 per cent. Of the total patients in the series, only seven manifested puerperal infection clinically in terms of fever later than four days after delivery. An interesting observation was that the thrombophlebitic form of infection was the cause of death in a large percentage of those patients whose febrile reaction had begun during labor. The amount of elevation of temperature naturally tended to be highest in the septicemia and thrombophlebitis groups. Temperatures of 105° F. and above were recorded in 44.61 per cent of total cases and the high level of 107° F. or above was reached in 13.85 per cent. The duration of the infectious process in terms of days postpartum at time of death varied considerably according to the type of process involved and averaged approximately ten days in the septicemia and peritonitis groups, as contrasted with thirty days in the thrombophlebitic type. Death occurred within a week of delivery in 35.38 per cent of the series while more than a month elapsed before the fatal issue in 12.31 per cent.

SUMMARY AND CONCLUSIONS

Since the opening of the Obstetrical Department of the Johns Hopkins Hospital in 1896 to the end of 1930, there have occurred 115 deaths due to puerperal infection. In the foregoing paragraphs a statistical analysis of these cases has been presented demonstrating certain mortality rates and indicating various factors obtained from the case records which seemed to affect the ultimate prognosis. The following summary gives the main positive findings.

1. In a series of 33,918 patients the death rate due to puerperal infection was 0.339 per cent or 1 in 295 admissions. The majority of these deaths occurred either following abortion or delivery at term by some outside agency, the patient already showing evidence of intrauterine infection at the time of admission. A much lower mortality rate occurred in those registered patients delivered by the service at or near term. This fatal infection rate may be termed the Clinic responsibility and was 0.106 per cent or 1 in 943 deliveries.

2. Peritonitis was the immediate cause of death in approximately three-fifths of these fatal cases, while septicemia accounted for a quarter, and thrombophlebitis a tenth of the total.

3. Puerperal infection, according to our experience, has a more ominous prognosis in black as contrasted with white women. Four-fifths of the deaths due to peritonitis and thrombophlebitis occurred in the colored patients, while whites predominated in the septicemia group.

4. Although puerperal infection occurred most frequently in primiparas and women of the younger age groups the mortality was highest in multiparas and those of greater age.

5. Although the incidence of operative delivery for the Clinic was only 17 per cent, more than half of the fatal cases of puerperal infection followed some type of operation. Cesarean section had been performed in 23.4 per cent of the total deaths, although in most instances these patients were admitted with obstructed labor and intrapartum infection following care by some outside agency. Seventy-two per cent of the deaths occurring in registered patients followed spontaneous delivery. A policy of conservatism, together with scrupulous regard for surgical principles when operative manipulation becomes necessary, offers, in our experience, the best results.

6. A febrile reaction was present during labor in 34.85 per cent of this series of fatal cases. This may be contrasted with a 3.82 per cent incidence of intrapartum infection for the general clinic population.

7. Streptococci were obtained from intrauterine culture in 84.61 per cent of the total cases of the series. A comparison of the culture

reports in fatal and nonfatal cases of puerperal infection attested the virulence of *Strep. hemolyticus* and *Strep. viridans*, although a number of deaths occurred due to the aerobic nonhemolytic and anaerobic varieties. The incidence of *Staph. aureus* infection was four times and of the colon bacillus twice as great in the fatal cases as compared to a series of 771 cultures routinely obtained in patients with clinical puerperal infection. The Welch bacillus was found as a major invader in 15.38 per cent of the total cases.

7. Fever, if not present during labor, usually manifested itself early in the fatal cases, and in most instances rose to a high level. When death was due to septicemia or peritonitis the average number of days elapsing between delivery and the fatal termination was 10, and in thrombophlebitis 30.

8. In view of the present knowledge of the etiology, prophylaxis, and treatment of puerperal infection it is our opinion that approximately two-thirds of the maternal deaths due to this condition are preventable.

A STUDY OF SURFACE BACTERIA OF THE NEWBORN AND THE COMPARATIVE VALUES OF CLEANSING AGENTS

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EVERY hospital that includes in its service an obstetric department faces, sooner or later, the problem of care and prevention of skin infections of the newborn.

Those who have had the responsibility of treating sporadic or epidemic cases of severe types of cutaneous infections of infants realize the problems involved. By the severe types we refer to that disease synonymously termed impetigo contagiosa, impetigo neonatorum, and pemphigus neonatorum.¹ Lacking such experience, one has only to read the report of McCandlish² or that of Cole and Ruh³ to learn the seriousness of the disease, its tendency to become epidemic, the difficulty in checking epidemics and the havoc it can cause in hospital wards. Gandy,⁴ in a recent report, furnishes a vivid account of his experience in two such epidemics.

Treatment of impetigo or pemphigus neonatorum begins not with the onset of the disease but at birth when proper and adequate measures should be instituted in an endeavor to prevent its occurrence.

Each hospital has its own, or some approved, method of initial cleaning and daily care of the newborn. Whatever method is employed the

aim should be, first, to clean mechanically the body surface without irritation and, second, to protect that surface from bacterial invasion. If this protection can be given by means of some application which does not injure nor irritate the infant's skin, we feel that the incidence of troublesome, not to say dangerous, cutaneous infections can be definitely reduced or prevented.

At the Orange Memorial Hospital various routines have been employed. Until 1927, babies were given an initial cleansing with olive oil followed by daily soap and water baths. Later, 5 per cent ammoniated mercury ointment was used following, in a general way, the suggestions of Chadwell.⁵ Finally, in 1933, a routine was adopted which has been in force since then. This consists of an initial, prepared soap bath, drying and completely anointing with 3 per cent ammoniated mercury ointment as soon after birth as possible. Each day following, during the entire stay in the hospital, the babies are oiled with a medicated, blended oil. No water is used after the initial bath.

During the period from March, 1931, to January, 1935, among 1,310 newborn babies, the total number of skin infections was 26 (0.019 per cent). Of this number, twelve (0.009 per cent) were impetigo. One baby was born with a single lesion, the remaining eleven were postnatal in origin. Table I shows the incidence of skin infections since the adoption of the present routine.

TABLE I. INCIDENCE OF SKIN INFECTIONS. MAY, 1933 TO MAY, 1935 (651 BABIES)

	CASES OF IMPETIGO	NONIMPETIGENOUS ERUPTIONS
1933	1	1
1934	3	3
1935	1	2
Total incidence, 0.016%; impetigo incidence, 0.007%		

Our comparative freedom from sporadic cases of impetigo and the absence of any recent epidemics has afforded us much satisfaction in, and reliance upon, the technic used. So satisfactory have been our results we were prompted to learn by experiment, if possible, the relative value, particularly the bactericidal value, of different applications made on the surface of the skin.

Since skin or mucous membrane invasion by the staphylococcus is the accepted route of infection in impetigo, it was decided, as a basis for this study, to determine by bacterial examination the number and character of organisms present on the surface of the babies at birth. With this fact established we could then test the effectiveness of different cleansing agents commonly used on infants by noting the increase or decrease of the bacterial flora.

The procedure decided upon was as follows: cultures were taken by means of a sterile, rigid, Nichrome loop from three prominent areas on the baby (1) im-

mediately after delivery; (2) the first day following birth, after the initial cleaning but before the routine daily care was started; and (3) on the third day postpartum. The areas on the body selected were (A) the chin in head presentations (the sacrum, in breech births), (B) the right side of the neck, and (C) the right groin. The cultures were taken by gently scraping the loop over a rectangular skin surface, roughly 8 by 12 mm. in area. The loop was then dipped and agitated in a tube of brain infusion broth. This liquid media was added to melted agar in a Petri dish which, after solidifying, was incubated for forty-eight hours. A colony count was then made with identification of the different types of colonies present. When the colonies were great in number they were enumerated by means of a Lofar counting plate.

There were three series of experiments. The first was carried out by taking the cultures as outlined above, using our standard technic with the babies, i.e., initial soap and water bath followed by 3 per cent ammoniated mercury ointment, then daily applications of the medicated, blended oil. With this routine the first cultures were taken directly after birth before any applications had been made to the skin; the second cultures on the day following birth, after the soap bath and ammoniated mercury treatment but before the use of the medicated oil; the third cultures on the third day after birth, medicated oil alone having been used since the primary cleansing.

In the second series the cultures were taken at the same respective intervals and from the same areas but the soap bath and ammoniated mercury ointment were deleted. The medicated oil was the only preparation used on the skin.

The procedure in the third series was the same as in the two preceding except that sterile cotton seed oil was the cleansing agent used.

Fifty-two babies were examined and a minimum of nine cultures taken from each. In the first series there were 14 babies, in the second series 24, and in the third series, 14. A separate record was kept for each child on which was tabulated the name, date of birth, the number and type of colonies obtained from each area A, B, and C after each culture 1, 2, and 3, the length of labor, the number of rectal or vaginal examinations made on the mother, the type of delivery, and the presence or absence of maternal, vaginal discharge.

The first tabulation was for each group or series. The total number of colonies from each site in the respective series was added and a composite graph prepared. In this manner we were able to determine the number of bacteria present at birth and evaluate the bactericidal effect of the different preparations subsequently used on the baby. Figs. 1, 2, and 3 show the composite graphs of the three series.

In reading the graphs, it must be remembered that they indicate the findings of the groups as a whole. In a number of cases, in Series 1 and 2, we found an initial sterility on all three areas which we were able to maintain throughout the study. In others, where bacteria were present on the first cultures, we were able to reduce the number of colonies or render the areas sterile. In the third series, however, when bacteria were found they usually continued to increase in number and, if an area was sterile at birth, subsequent cultures invariably grew colonies.

The similarity between the graphs of Series 1 and 2 is striking. Although in neither is "group sterility" of the skin obtained, there is considerable reduction in the number of surface bacteria on those parts of

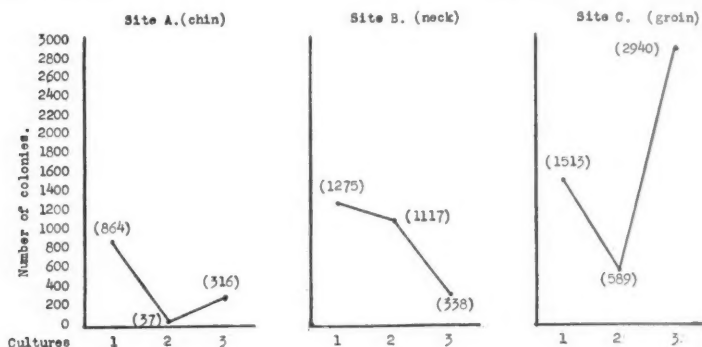


Fig. 1.—Composite graph of bacterial colonies. First series, 14 cases. Cleansing agents in Series 1: soap bath, ammoniated mercury, and medicated oil.

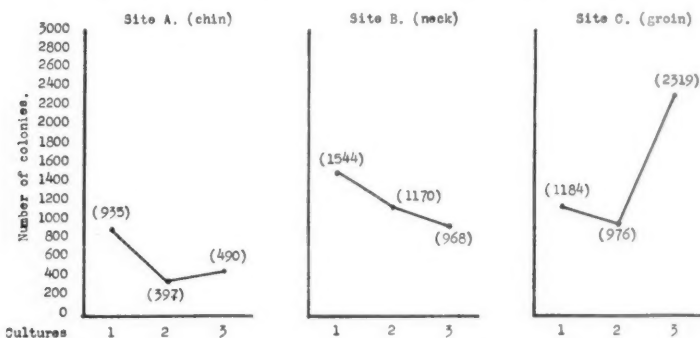


Fig. 2.—Composite graph of bacterial colonies. Second series, 24 cases. Cleansing agent in Series 2: medicated oil.

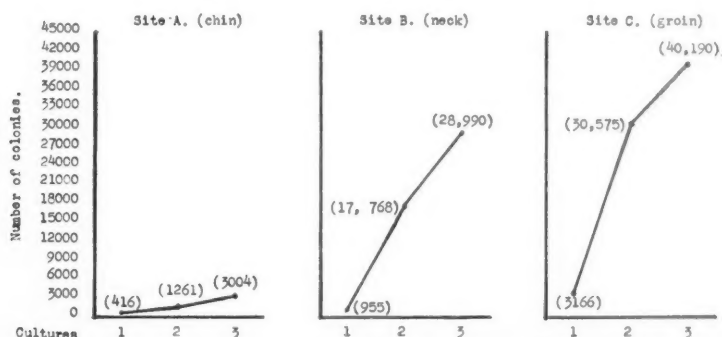


Fig. 3.—Composite graph of bacterial colonies. Third series, 14 cases. Cleansing agent in Series 3: sterile cottonseed oil.

the body, i.e., (A) chin and (B) neck, which can be easily and readily kept clean. In Area C, the groin, there was an increase in the number of colonies in both series after the second culture due, we believe, to re-implantations from diapers. This supposition is substantiated by the

fact that a majority of the colonies from the groin were identified as *B. coli*, while in Areas A and B (chin and neck) staphylococci predominated.

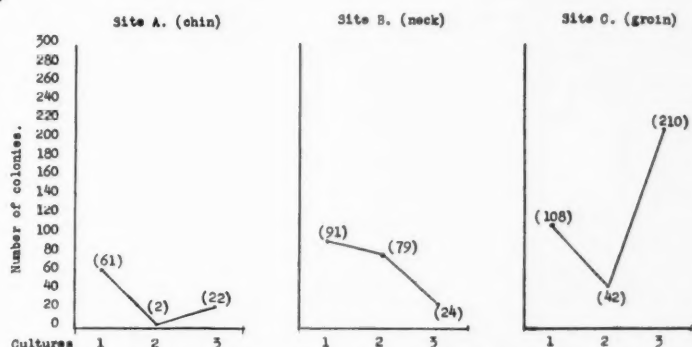


Fig. 4.—Bacterial colonies on individual babies. First series. Cleansing agents: soap bath, ammoniated mercury, and medicated oil.

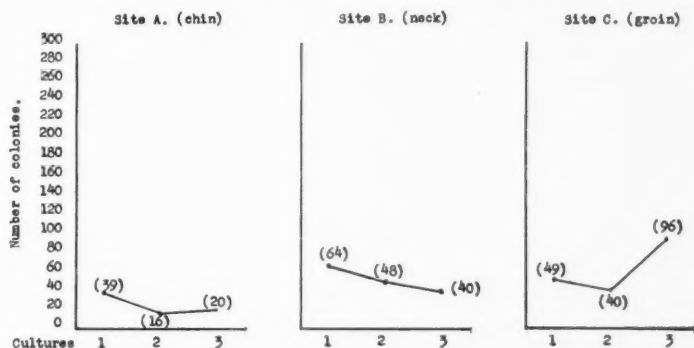


Fig. 5.—Bacterial colonies on individual babies. Second series. Cleansing agent: medicated oil.

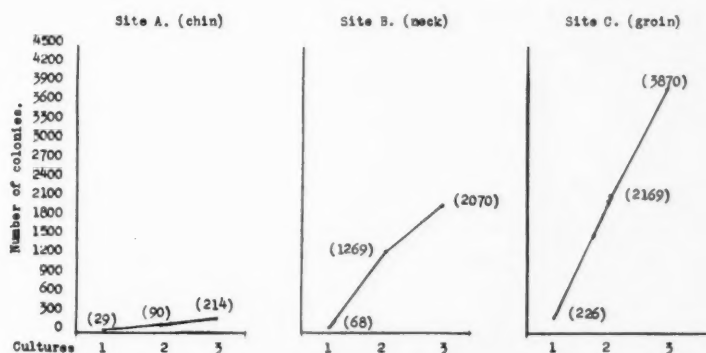


Fig. 6.—Bacterial colonies on individual babies. Third series. Cleansing agent: sterile cottonseed oil.

In Fig. 3, the graph compiled from patients treated only with sterile cotton seed oil, we find an entirely different picture. From the first culture there is an uninterrupted increase of surface bacteria in all areas

cultured. The colonies, in many instances, reached a considerable number—as many as 5,000 to 6,000 were present on numerous plates.

Reducing the group findings to an average, individual basis, gives the results shown in Figs. 4, 5, and 6. These curves were plotted because of the unequal number of cases in the three series.

The curves in these graphs follow the same general course as corresponding curves in Figs. 1, 2, and 3. In Fig. 4, the graph for Series 1, in which ammoniated mercury was used, we find a reduction in the number of colonies, after its use, of 53 per cent. Following this, at the time of the next culture, there is an increase in the number of colonies of over 100 per cent. In Fig. 5, showing the results in that group where only the medicated oil was used, although the reduction in the number of colonies from the original count was but 32 per cent, the increase following this was only 34 per cent. The total number of bacterial colonies on babies in this group, not including the original count over which we had no control, was 32 per cent less than those found on infants in the first group. It is reasonable to conclude that, of the two procedures, the routine which employs medicated oil alone better inhibits the growth of bacteria on the skin of infants. If, as Gandy⁴ has reported, ammoniated mercury ointment is objectionable, the use of this unguent as a bacterial inhibitor is not necessary if medicated oil is used.

The graphs in Fig. 6 need scarcely be considered since they, like those in Fig. 3, show a steady increase in the bacterial count. It indicates clearly that cotton seed oil has no value, other than a mechanical cleansing agent, as a preparation to prevent or inhibit the growth of bacteria on the skin surface.

The organisms cultured were practically all staphylococci and *B. coli*. Occasionally a spore-forming organism was grown. Both staphylococci and *B. coli* were found, at various times, on all three areas at birth. On subsequent cultures, when bacteria were grown, the staphylococcus predominated on the chin and neck while *B. coli* was most common on the groin.

No cutaneous lesions occurred on any of the infants studied, and it is apparent that the mere presence of bacteria on the skin is not the only factor predisposing to skin infections. Whatever other considerations may be involved (and we recognize that many are), the use of some cleansing substance or agent capable of reducing the number, or inhibiting the growth, of surface bacteria is desired.

In considering the length of labor, the time of rupture of the amniotic sac, and the number of rectal or vaginal examinations in reference to surface bacteria, we found there was no definite relationship. The presence of a vaginal discharge in the mother was associated, almost invariably, with a considerable number of colonies in the first plate cultures taken from her baby.

Two of the babies were twins, and it is interesting to note that cultures from all three areas on the first child showed numerous colonies, while the second baby was sterile in two areas and had but a few bacteria (staphylococci) on the third.

CONCLUSIONS

1. Although a few babies showed surface sterility at birth, in the areas cultured, the majority were nonsterile.
2. Initial cultures from babies born of mothers with a vaginal discharge invariably showed many bacterial colonies.
3. The majority of organisms cultured were *Staphylococcus albus* and *B. coli*. A few (cultures from 5 babies) grew a large spore-forming bacillus.
4. The use of an antiseptic in the cleansing agent reduces the number of surface bacteria.
5. The use of a sterile, nonantiseptic oil does not decrease the number of surface bacteria.
6. Medicated oil, used alone, has greater inhibiting powers on surface bacterial growth than when used with ammoniated mercury ointment.
7. It is probable that oil, in itself, has a beneficial effect on the skin and increases its resistance to infection.

REFERENCES

- (1) Matzenauer, R.: Wien. klin. Wchnschr. 13: 1077, 1900. (2) McCandlish, H. S.: AM. J. OBST. & GYNEC. 9: 234, 1925. (3) Cole, H. N., and Ruh, H. O.: J. A. M. A. 63: 1159, 1914. (4) Gandy, D. Truett: Arch. Ped. 52: No. 7, 1935. (5) Chadwell, O. R.: New England J. Med. 199: 983, 1928.

MECHANICS OF UTERINE SUPPORT AND POSITION*

II. FACTORS INFLUENCING UTERINE POSITION (AN EXPERIMENTAL STUDY)

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SUCCESSIVE gynecologic residents, acting as consultants at the State Sanatorium at Oakdale, Iowa, have discovered such an unusually high incidence of retroversion among patients who were examined for minor gynecologic complaints that some causative factor, common to women confined to bed with pulmonary tuberculosis, was suspected. Obviously, there can be no relationship between pulmonary tuberculosis and retroversion in women with otherwise normal pelvic viscera. The only common factors other than tuberculosis, discoverable in these patients, were confinement to bed and the supine posture, which is usually preferred to any other, especially during waking hours.

If the posterior position of the uterus be due to the supine posture of the patient in bed, a shift to the prone posture should produce a cor-

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responding shift in uterine position. This theory was tested on patients confined to bed at the State Sanatorium at Oakdale.

SUBJECTS

Twenty-five women volunteered to serve as subjects. One of these who had an ovarian cyst (subsequently removed), another whose uterus had been operated upon previously, and three others who for various reasons were unable to maintain the prone position for longer than a few hours at a time were excluded, leaving a total of 20 satisfactory subjects (Table I). All of these women were suffering from

TABLE I. DATA ON SUBJECTS, INITIAL POSITION OF UTERUS AND CHANGES IN POSITION PRODUCED BY ALTERATIONS IN BODY POSTURE

Note that seven of the twenty women were found to have anteverted uteri at initial examination. Four of these lay habitually on side and/or abdomen, and two were permitted to be out of bed part of the time. Also note that the uteri of an overwhelming majority of the patients (80 per cent) changed position four times in response to changes in body postures.

IDENTIFICATION	AGE	SINGLE, MARRIED, DIVORCED	PARITY	UTERUS, INITIAL POSITION	HABITUAL BED POSTURE OF PATIENT	NUMBER OF CHANGES EFFECTED IN UTERINE POSITION
1. D. J.	23	S	0	Posterior	Had been lying on back prior to initial examination	4
2. L. U.	28	S	0	Posterior		4
3. K. B.	23	S	0	Posterior		4
4. A. C.	24	S	0	Posterior		1*
5. J. C.	27	M	0	Posterior	Side or back	4
6. A. L.	25	S	0	Posterior	Side or back	4
7. C. W.	24	S	0	Posterior	Side or back	4
8. M. A.	24	M	0	Posterior	Side or back	4
9. N. D.	29	D	0	Anterior	Side or abdomen	4
10. J. T.	30	S	0	Posterior	Side	4
11. W. T.	28	S	0	Posterior	Side or abdomen	4
12. M. H.	24	S	0	Posterior	None	4
13. C. N.	20	S	0	Posterior	Side or back	4
14. C. G.	33	M	7	Anterior	Side or back, up much of time	4
15. V. W.	31	M	2	Anterior		4
16. M. J.	23	M	1	Anterior	Side or back	4
17. M. F.	19	S	0	Anterior	Side or abdomen	4
18. K. T.	26	M	3	Posterior	Side or back	1†
19. F. F.	22	S	0	Anterior	Side	0‡
20. G. O.	25	M	3	Anterior	Abdomen	0‡

*Uterine position failed to change more than once despite adequate opportunity.

†Patient discharged before completion of study.

‡Uterine position never changed despite adequate opportunity.

active pulmonary tuberculosis of varying degree, but their pelvic viscera were normal so far as could be ascertained by bimanual examination and anamnesis. One of them had undergone an appendectomy through a right rectus incision and was the only patient with an abdominal scar. All except No. 9, N.D., whose uterus was found to be anteverted at the initial examination, were in an excellent state of nutrition.

METHOD

The patients whose uteri were found to be anteverted were asked to lie in the supine position, and those whose uteri were retroverted, in the prone position, as much of the time as possible. They were permitted to lie either on the right or left side whenever a change of position became imperative. At first bimanual examinations were done daily, but later it was found that examination every two to four

days, according to individual needs, was often enough. All examinations were done during the intermenstrual period by the authors, with the patient in the lithotomy position. It was regarded as unlikely that the uterus could displace intestines sufficiently rapidly to alter its position during the few moments necessary to conclude an examination. This belief seems to be confirmed by the present findings.

RESULTS

Thirteen, or 65 per cent, of the 20 women were found to have retroverted uteri at the first examination (Table I). All except one of these had either lain on her back habitually or had done so for several days preceding examination. Of the seven whose uteri were originally anteverted, four lay habitually on side and/or abdomen, and two were permitted to be out of bed part of the time.

The position of the uterus changed at least once in 18 of the 20 subjects (90 per cent), and four times in 16 (80 per cent). It did not change during the period of observation in two patients (Nos. 19 and 20), although they cooperated and were afforded as much opportunity as any of the others for a change to occur.

The maximum and minimum intervals, 267 and 25 hours, respectively, between observed changes in uterine position are recorded in Table II. The longest time spent in any designated posture was 151 hours, the shortest, 20 hours. Many patients were examined two, and even three, times during maintenance of a given posture before change in uterine position was noted. Hence, although the actual length of time necessary to effect a change in uterine position is not known, it is probably a matter of days rather than hours.

TABLE II. LAPSE OF TIME BETWEEN CHANGES IN UTERINE POSITION IN HOURS

Note that the lapse of time necessary for any change in uterine position to take place is a question of days instead of hours.

DIRECTION OF CHANGE IN UTERINE POSITION	MAXIMUM		MINIMUM	
	TIME SPENT IN DESIGNATED POSITION	ELAPSED TIME BETWEEN EXAMINATIONS	TIME SPENT IN DESIGNATED POSITION	ELAPSED TIME BETWEEN EXAMINATIONS
Anterior to posterior	143	267	20	25
Posterior to anterior	151	218	24	48

DISCUSSION

Inasmuch as it is scarcely conceivable that pulmonary tuberculosis can influence the position of the uterus in a woman whose pelvic and abdominal viscera are normal, it becomes necessary to invoke some other explanation for the retroversion found in 13 of the 20 patients in our series. The data presented herewith indicate that posture in bed was the principal determining factor in 90 per cent of our 20 subjects. Its influence was especially pronounced in the 16 patients in whom the uterus responded obediently to four changes of posture. Why posture had no effect in two patients is not clear.

The time which was required for the uterus to change its position is of interest in view of the frequency with which patients are told that a fall or other sudden trauma probably caused a retroversion. No change in uterine position occurred in less than twenty hours, and in one patient, who was being examined frequently, one hundred fifty-one

hours were required. If the action of gravity is assumed to play an important rôle in influencing uterine position, it is necessary to explain why its action is so slow. The difference in the relative specific gravities of uterus and intestines is probably not large, so that the *effective weight* of the uterus is much less than the actual weight of the organ when removed from the body. Furthermore, when the uterus is anteverted and intestines are packed behind it in the true pelvis, many hours, or even days, must elapse before the relatively small effective uterine weight can displace the loops of bowel, even though uterine movement may be aided by intestinal peristalsis. In our experiments, when no change occurred within twenty-four hours, it was observed that maintenance of the same posture for an additional twenty-four hours would often bring about the desired change. Therefore, it must be impossible for the uterus to become retroverted in the few minutes which it takes for a patient who has been maintaining the prone position to turn over on her back for pelvic examination. If it be true that change in uterine position occurs only during the lapse of days, instead of hours or minutes, our present conception of the effect of knee-chest postures and postural exercises upon uterine position must be revised. Schauffer¹ compared the results of practicing postural exercises with the results of neglect, six weeks after parturition, in each of two series of 84 and 85 patients, and found that the incidence of postpartum retroversion was considerably higher among the women who had practiced exercises than among the controls. This tends to confirm our suspicion that the few minutes a woman spends in supposedly corrective exercises or postures have no effect whatsoever on the position of the uterus. Our experimental data indicate that the high incidence of postpartum retroversion is referable to maintenance of the supine posture during the postpartum period, together with involution which is sufficiently rapid to allow the uterus to maneuver in the pelvis before the patient leaves her bed.

It was pointed out in the initial paper of this series² that the lowermost portion of the uterus, including the cervix, is firmly fixed in the parametrial and paravaginal tissues. The ligaments attached to the fundus were found to be useless as suspenders, and it was postulated on an anatomic basis that the fundus of the uterus is a movable organ. Halban and Tandler³ had pointed out previously that, "Because the uterus in a physiologic manner is a movable organ, one may not speak, therefore, of the unconditional maintenance of a definite uterine position . . ." Why, then, does the uterus lie anteriorly, in the so-called "normal position," in the majority of women? It is suggested that this is due to the forward tilt of the pelvis in the erect posture, in which healthy women spend a majority of their waking hours. The fundus, therefore, gravitates more readily anteriorly than posteriorly.

Whether or not this explanation is correct, the data here presented indicate that a uterus which is free both from old adhesions and active

disease may alter its position in response to body postures if they are maintained for a sufficient length of time. In other words, the completely normal uterus is a movable organ within certain limits. The cervix is anchored, but the fundus is free to move in the anteroposterior plane. Its movements are executed very slowly, because being suspended in a semifluid medium, its effective weight is small.

CONCLUSIONS

1. Thirteen (65 per cent) of 20 women with normal pelvic viscera, confined to bed with pulmonary tuberculosis, were found to have a retroversion of the uterus. Four of the remaining 7 who were found to have anteversion at the initial examination habitually rested in bed either on the side or abdomen, and 2 were out of bed much of the time.

2. A change of uterine position was effected in 18 (90 per cent) by altering the patient's posture in bed.

REFERENCES

- (1) *Schauffler, Goodrich C.*: J. A. M. A. 99: 726, 1932. (2) *Mengert, William F.*: AM. J. OBST. & GYNEC. 31: 775, 1936. (3) *Halban, Josef, and Tandler, Julius*: Anatomie und Aetiologie der Genitalprolapse beim Weibe, Wien und Leipzig, 1907, Wilhelm Braumüller.

DISCUSSION

DR. WILLIAM T. BLACK, MEMPHIS, TENN.—A change in position of the uterus has been noted by me on various occasions, before and after operation.

The essayist has only investigated normal uteri. The retrocessed, anteverted uterus, which is usually small, does not change position. This condition is due to an endocrine dysfunction and an absence of muscular development which prevents proper rotation forward of the uterus.

Dr. Mengert has shown that the paravaginal and uterine tissues are essential for normal uterine support. There are, however, intraabdominal pressure and pelvic viscera to be reckoned with, as well as the serous and two muscular ligaments. If the uterosacral ligaments are shortened by suture to the cervical fascia, the cervix comes back to a normal position and probably would remain in this position. Shortening and fixing the round ligaments helps maintain this position. The round ligaments do not support the uterus, but if they are shortened and fixed to other structures, the uterus will remain in position indefinitely.

A lack of a good general musculature, plus a reduction in the blood volume in these organs in a resting position, causes a more flaccid condition, and assists in the change of uterine position, especially in the anemic patient.

A practical lesson should be drawn from this work, namely, that we should know about the previous uterine position of patients and study their symptoms carefully before advising an operation upon the uncomplicated retrodisplaced uterus.

DR. ERWIN VON GRAFF, DES MOINES, IOWA.—One of the main arguments against total hysterectomy has always been that the removal of the cervix favored prolapse of the vagina. We have never seen a prolapse of the vagina in these patients, which was not surprising, for Tandler and his school proved, long ago, that the uterus and the vagina each had their individual support.

These statements are of practical consequence in regard to the technic of abdominal total hysterectomy. In the belief that the vagina would otherwise prolapse, it has seemed necessary to many operators to fix the stumps of the infundibulopelvic

ligaments or adnexa to the vagina. At the Wertheim Clinic, we purposely avoided making this contact because (a) we knew that it was unnecessary, (b) it encouraged stump exudates, and (c) eliminating the procedure saved time.

DR. J. C. LITZENBERG, MINNEAPOLIS, MINN.—When we speak about the position of the uterus we may refer to any one of four quite different things, namely, flexion (attitude), version (tipping), cession (distance from symphysis), or station (presence or absence of prolapse). Substituting the word "station" for "position," I agree that Dr. Mengert has proved his thesis as to the station, in other words, as to prolapse of the uterus. I am unconvinced that he has proved his thesis as to the version of the uterus.

Anybody who has studied under Tandler will agree that the so-called ligaments of the uterus have nothing to do with version, but that intraabdominal pressure is the thing upon which version of the uterus depends. Furthermore, intraabdominal pressure is dependent upon the tone of the muscles of the abdominal walls and an intact pelvic floor.

DR. CHARLES F. MOON, OMAHA, NEB.—I would like to ask whether Dr. Mengert considered the relation of a fixed point in measuring the station of the uterus rather than a movable point. It seems to me that using the ischial spines as a fixed point rather than the introitus, which is a movable point, would give a more scientific measurement.

DR. CARL P. BAUER, CHICAGO, ILL.—I think one very important fact has been left out, that is, that women who have not had children and have retroversion have a very short anterior vaginal wall, and those that acquire retroversion have a very long anterior vaginal wall.

DR. MENGERT (closing).—Dr. Black pointed out that muscle tone had a great deal to do with the matter, and that is unquestionably true. The first part of our study was done on cadavers, most of them warm, but nevertheless we were not dealing with normal muscle tone, and the same thing is true of the muscles of women who have been in bed for a long time.

I cannot see how intraabdominal pressure can hold the uterus anteriorly or posteriorly. We all know, or have heard, that if a diver lies down on the bottom of the ocean, the pressure of the water above will not hold him down because the pressure is transmitted equally in all directions. I cannot see why, if a uterus is thrown backward, intraabdominal pressure will hold it there, for there is bound to be the same pressure underneath the uterus that there is on top of it.

In the actual measurements we had a string tied to a weight and led over a pulley at the foot of the table. The cadaver did not move on the table, so it represented a fixed point. The descent of the uterus was measured by comparing a chosen point on the string with a meter bar.

DR. J. C. LITZENBERG, MINNEAPOLIS, MINN.—If intraabdominal pressure were exactly hydrostatic pressure, Dr. Mengert's objection would be correct because the fluid would then be under the uterus as well as above it. But it is not water, it is the intestines and their contents and the intraabdominal pressure is applied to the uterus by the intestines. If anything occurs to permit the intestine to slide anterior to the uterus, then intraabdominal pressure ceases to act upon the posterior surface of the uterus and the uterus may tip backward. It is Tandler's conviction that the uterus is held in version by intraabdominal pressure which is dependent upon an intact pelvic floor. As long as the intestines are behind the uterus, as in a normal woman, it will be held anterior. He has also stated that the reason the uterus is held in retroversion is the same force, and that the ligaments have nothing to do with maintaining either anteversion or retroversion.

CUTANEOUS HEMORRHAGE DURING PUERPERIUM WITH LATER DEVELOPMENT OF ACUTE YELLOW ATROPHY

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NONTHROMBOCYTOPENIC purpura during the puerperium is exceptionally rare. In searching through the literature we have been able to find but one case,¹ a twenty-four-year-old primipara who developed petechiae and hematuria twelve days after premature (seven months) labor. Two days later the patient developed severe headache and the petechiae spread from neck to face, conjunctivae and trunk. Besides hematuria, a bloody sputum appeared. The outcome was fatal. In reporting this case the author adds that an older sister of this patient had died fourteen days previously during the sixth month of her pregnancy following a febrile course (39.8°) complicated by purpura. Immediately after purpura appeared the patient went into premature labor and died of postpartum hemorrhage. Wiener reported these observations in 1887 and no laboratory material is available to determine the type of purpura. The hematuria, hemoptysis and fatal outcome would seem to indicate that this probably was not a case of nonthrombocytopenic purpura.

Because of the rarity of this condition during puerperium and its obscure etiology we thought it would be worth while to report the following case:

Lillian L., white, aged twenty-seven, reported to the Ante-partum Clinic on May 26, 1934, during the third month of her first pregnancy. Her past menstrual and family histories were noncontributory, and she presented no complaints. Physical examination was completely negative and the pelvis was found to be ample in all diameters. During her twelve subsequent visits to the clinic she had no complaints except for an occasional cramp in the left leg; her weight was found to have gradually increased from 149.5 to 178 pounds; urines were uniformly negative; blood pressure varied from 98/60 to 120/96; Wassermann was negative; the fetal heart sounds were first heard on November 1 and were normal at all subsequent examinations; the position at the last visit was diagnosed as R.O.T.

On Jan. 10, 1935, she was referred to the hospital for induction of labor since she was fourteen days past her expected date of confinement and a relatively large baby was suspected. On admission the patient offered no complaints and looked well. Blood pressure 120/84. The fetus was large and in R.O.T. position with an unengaged but dipping head. Patient was given castor oil (60 c.c.), quinine (0.3 gm.), and an S. S. E. with no effect. January 12, with the cervix thick and one to two fingers dilated, irregular weak pains began. January 13 castor oil, quinine, and S. S. E. were repeated as on admission. Not until the morning of January 14 was the cervix completely dilated. The membranes were then artificially ruptured, normal amniotic fluid liberated, and three hours later, when satisfactory progress had ceased, an episiotomy was performed, the head was rotated from R.O.T. position by a Kielland and then delivered by a Tucker-McLane forceps. This procedure was not particularly difficult, the total blood loss was 300 c.c., the duration of labor was forty hours, and the child weighed 4,570 gm. It should be added that the delivery was preceded by rectal analgesia (60 c.c. of ether plus 52 c.c. of olive oil plus 0.6 gm. of quinine plus 8 c.c. of alcohol) and later supplemented by inhala-

tion anesthesia (nitrous oxide plus ether plus oxygen through Gwathmey apparatus). Immediately after delivery she was given 1 c.c. of pituitrin and 1 c.c. of ergotamine tartrate.

Within an hour the patient complained of chilliness and looked pale. Pulse was 140 and blood pressure 80/60. Three hundred cubic centimeters of gum acacia-glucose solution were given intravenously, following which blood pressure rose to 120/74 and pulse fell to 110. Six and one-half hours after delivery she became stuporous and dyspneic. Ventricular rate 140, extremities cold and clammy, pulse imperceptible, and blood pressure unobtainable.

A striking purpuric manifestation now appeared. The cheeks, nose, chin, and lower forehead took on a bluish-black discoloration while the circumoral and circum-orbital areas remained conspicuously free. The entire face was considerably edematous (Fig. 1). The gums were deep blue but the tongue and buccal mucous



Fig. 1.—January 15. Photograph taken twelve hours after onset of purpura.

membranes were of normal color. The shoulders and lateral surfaces of arms and forearms assumed a fainter cyanotic hue, while the fingers and nail beds remained unchanged. Eye grounds were normal. Oxygen inhalation did not affect any of the discolorations. Spectroscopic examination of blood was negative for methemoglobin, urine examination was negative for phenol, cyclic amines and benzene, and Rumpel-Leede test at 65 mm. of mercury (blood pressure 94/70) was negative at end of two minutes.

The signs of shock responded favorably to transfusion (500 c.c. of whole blood), intravenous gum-acacia glucose (300 c.c.), and application of heat administered within several hours after purpura appeared. The discoloration, however, persisted and a few small additional areas later appeared on lateral aspects of both thighs. The following day the blood pressure was 114/84, nonprotein nitrogen 37 mg. per 100 c.c., R.B.C., 2,860,000, and Hb. 60 per cent. Catheterized urine showed sp. gr. of 1.015, albumin two-plus, benzidine four-plus, and urobilinogen present in 1:20

dilution and many R.B.C. Bleeding time (Duke) was two and one-half minutes; coagulation time (capillary tube) three minutes; sedimentation rate 18 mm. in sixteen minutes; and platelet count was normal.

On January 18 the color of the involved areas began to change gradually to a violaceous redness and the eruption assumed a vesicular character, small epidermal blebs containing clear serum became visible. Within next few days these blebs ruptured and desquamation occurred. This process had no resemblance to the sequence of events usually noted in the fading of ecchymosis and no yellow zone of discoloration remained to mark the site of the original lesion. By January 31 the skin appeared perfectly normal (Fig. 2).

On the fourth day postpartum she developed a temperature of 100° F. which gradually rose during the next six days to 102° F., slowly returning to normal. This was believed to be due to a staphylococcus infection of the perineal wound. Before



Fig. 2.—January 31. Appearance of patient on discharge.

discharge, patient was tested for hypersensitivity to fluid extract of ergot by oral, patch, and intracutaneous methods and was found to react normally. On Feb. 9, 1935, mother and baby were discharged in excellent condition.

On Feb. 20 she was seen in postnatal clinic. Her general condition was excellent. Perineal wound well healed. No complaints except for a mild diarrhea the previous day. On February 25 she returned, now appearing markedly jaundiced (for the fourth day) and complaining of dizziness, headache, pruritus, clay colored stools, and vomiting for the past twenty-four hours. Her temperature was 103.8° F. and she was admitted to the Third (N. Y. U.) Medical Division. On examination she did not look severely ill; smooth liver edge was palpable two fingerbreadths below costal margin; blood pressure 95/75; and rest of examination was negative. Bile was present in urine and urobilinogen was present in undiluted urine but absent in 1:10 dilution. The blood count was normal. Qualitative Van den Bergh showed direct immediate reaction and the icteric index was 150. The bromsulphalein test

indicated 100 per cent retention. The urines of the following three days contained no urobilinogen and were positive for bile. The stools were negative for bile.

During the next week her temperature fluctuated between 100° and 103° F., and jaundice increased somewhat. On March 3 the patient became delirious and unmanageable and was transferred to the Psychiatric Division. On March 4 she was still delirious, bilateral Babinski's were noted, right ankle clonus noted, and liver edge was still palpable two fingerbreadths below costal margin. During the evening she sank into coma, developed pulmonary edema, and died early the following day.

Autopsy.—(No. 21670.) (Dr. Eugene Clark.) Performed six hours after death. External examination revealed no hemorrhages in either skin or mucous membrane. The chief pathologic changes were found in the liver. It seemed reduced in size. Its inferior margin was 2 cm. above costal margin and it weighed 1140 gm. The surface was smooth and of a pale yellowish brown color. The consistency was very soft and the organ did not retain its shape when handled. On section the cut surfaces were studded with discrete bright red foci, 1 to 2 mm. in diameter, separated by intervening tissue of yellowish orange brown color. The gallbladder, bile ducts, and blood vessels were normal. The lungs showed focal hemorrhages in the parenchyma, and submucosal hemorrhages in bronchi and trachea. The heart and aorta were normal. The spleen revealed hyperplasia of the pulp. There was cloudy

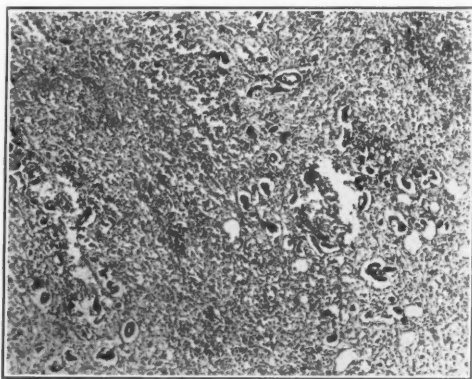


Fig. 3.—Low power photomicrograph of section of liver showing diffuse necrosis and loss of lobular architecture. A number of dilated, empty, small bile ducts can be seen in the field.

swelling of the kidneys. Subserosal and submucosal focal hemorrhages less than 1 cm. in diameter were found in the mesentery, stomach, jejunum, uterus, and urinary bladder. Subarachnoid hemorrhage was found in cisterna magna, about the base of the brain, and to a lesser extent over the hemispheres. There was no jaundice of the basal ganglia.

Microscopic studies.—The liver had undergone such radical alteration that identification was difficult (Fig. 3).

There were large areas presenting a uniform appearance with no recognizable lobular arrangement. There were many diffuse scattered necrotic liver cells in a background of amorphous material and of reticular framework. In other regions the lobular outlines were more readily distinguished and these contained areas where the parenchymal elements had completely disappeared, alternating with those in which the outlines of liver cells were still recognizable. Scattered bile pigment, groups of dilated and empty bile ducts, and foci of lymphocytic infiltration were present. There was no evidence of regeneration. Sections of a lymph node taken from porta hepatitis showed acute diffuse lymphadenitis.

Sections of the lung showed focal alveolar hemorrhage and lobular pneumonia; the kidney revealed cloudy swelling; the spleen, hyperplasia and congestion; the uterus, evidence of involution.

The primary pathologic diagnosis was acute yellow atrophy of the liver. Chemical analysis of the liver was negative for arsenic and mercury.

COMMENT

In 1926 Sir Thomas Lewis and I. M. Harmer² reported a case of cutaneous hemorrhage which bears a striking resemblance to that seen in our patient.

Their patient was a boy of fourteen years with acute lymphatic leucemia whose face became puffy and discolored and affected by a purpuric eruption on cheeks and forehead, following an attack of vomiting. The authors believed that "the purpura was evidently produced by a rise of venous pressure consequent upon diaphragmatic contraction. Since the eruption occurred chiefly in the skin of the face, the breaking point of facial vessels was apparently lower than for remaining cutaneous vessels." It will be recalled that the purpuric eruption in our patient was not preceded by vomiting and that fully six and one-half hours intervened between the end of labor and the appearance of the purpura. If, therefore, it should be true that a relatively lowered resistance of the facial capillaries to a suddenly increased venous pressure is responsible for the purpura we are unable to find the cause of the increased pressure.

It is important of course in seeking for a pathogenetic factor for purpura to consider the question of hypersensitivity. As has been noted, our patient was tested for, but showed no hypersensitivity to, ergot. Her past history of having taken castor oil as well as quinine on a number of previous occasions without untoward reactions excludes these drugs as possible antigens. Sensitivity to gum acacia has been reported both in experimental animals and in man^{3, 4} and must here be considered as a serious possibility. Unfortunately our patient was not tested with this antigen. It will be noted, however, that following the appearance of purpura the patient was again given 300 c.c. of gum acacia intravenously and no reaction followed.

Finally there remains the question of the relationship if any between acute yellow atrophy and the purpura or the preceding pregnancy. We hesitate to consider the acute yellow atrophy as a complication of our patient's pregnancy because more than five weeks elapsed between delivery and manifestations of her final illness; because during this intervening period there was an interval of perfect health and because sections of the liver showed no evidence whatever of any regenerative processes. For the same reasons we hesitate to link the purpuric eruption with the later development of severe liver pathology.

SUMMARY

A case is reported of a twenty-seven-year-old primipara who after a normal pregnancy and forceps delivery developed a purpuric eruption of peculiar distribution. Several weeks following complete recovery from this condition she developed acute yellow atrophy of the liver and died.

The various possible causes of the purpura and the relationship of acute yellow atrophy to the pregnancy and puerperium are considered.

NOTE: Since this paper was completed further facts have been brought to light which would make us feel that the intravenous use of gum acacia glucose was a factor in the production of this clinical picture. These findings will be the basis of a subsequent article to be reported by Studdiford.

REFERENCES

- (1) Wiener, M.: *Arch. f. Gynäk.* 31: 281, 1887.
- (2) Lewis, T., and Harmer, I. M.: *Heart* 13: 337, 1926.
- (3) Maytum, C., and Magath, T.: *J. A. M. A.* 99: 2251, 1932.
- (4) Spielman and Baldwin: *J. A. M. A.* 101: 444, 1933.

TRICHOMONAS VAGINALIS VAGINITIS*

A CLINICAL STUDY

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IF ALL human trichomonads belong to the same species and the trichomonas in the vagina and bladder are derived from the intestine, we find it difficult to understand why the intestinal strain should be relatively harmless while the vaginal strain, whether found in the vagina, the kidney, the bladder, or the prostate, is so frequently associated with distinctly pathologic conditions.

In the Gynecological Clinics of the Woman's Medical College Hospital and the Woman's Hospital of Philadelphia we examined 1,018 non-pregnant women, representing consecutive admissions to the dispensary, either new patients or patients who had not been seen for at least six months. One hundred and seventy-six or 17.3 per cent of these women showed *Trichomonas vaginalis* in their vaginal secretions examined by the fresh smear method. Of these women, 705 were white and showed an incidence of 13.8 per cent, 323 were colored with an incidence of 24.8 per cent.

The age incidence varied between ten and sixty-nine years, 124 being between twenty and forty years of age. Twelve patients had a co-incident gonorrheal infection as shown in the cervical smear.

Variations in seasonal incidence such as reported by Barringer were not uniform, the Woman's Hospital showing a larger incidence in winter and spring, while the College showed the reverse.

The majority of our patients (52.2 per cent) gave as the chief complaint symptoms directly referable to the vaginitis; that is, leucorrhea, burning, pruritus, etc. Here, our figures differ widely from Bland's, who reported that only 13.2 per cent of his patients voluntarily complained of such symptoms. Three-fourths of the patients in our series who did not give such chief complaint, on being questioned, admitted having leucorrhea. The remainder, although denying any discharge, on examination showed varying degrees of leucorrhea, 8 of them being typical cases of acute *Trichomonas vaginalis* vaginitis with profuse bubbly discharge. We believe, therefore, that *Trichomonas vaginalis* is not found in women entirely free of leucorrhea.

Of our series, 62.5 per cent actually had an inflammatory condition of the vulva or vagina. The presence of trichomonas in relatively scanty leucorrheal discharges in a vaginal canal not particularly pathologic,

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has been the chief cause of divergence of opinion as to the pathogenicity of this organism. Clinically, it is definitely established that *Trichomonas vaginalis* is found in the discharges associated with a type of vaginitis different from other vaginites, an association of the two so characteristic that the presence of the protozoon can be predicted with reasonable certainty on inspecting the vulva. The number of trichomonads present bears a direct ratio to the quantity of the discharge and the severity of the inflammation. As this subsides, the trichomonads disappear, but they never fail to reappear at the first sign of recurrence. Whether *Trichomonas vaginalis* alone is the actual cause of the inflammation, whether it acts in symbiosis with other organisms present in the vagina, or whether *Trichomonas vaginalis* is simply a saprophyte, still remains an open question.

TREATMENT

The drugs used for the treatment of this infection may be classified in three main groups:

1. General antiseptics,
2. Protozoocides,
3. Chemotherapeutic agents including alkalinizing and oxygenating substances, substances affecting osmotic pressure, etc.

We decided to use one type of drug from each of the above groups, and began three series using picric acid, quinine sulphate and sodium bicarbonate, respectively. Treatment was begun in every case by thorough wiping and drying of the vulva, vagina, and cervix. One distressing experience we had with thorough scrubbing of the vagina with tincture of green soap made us avoid such painful methods. We have wondered since, whether or not the clinicians who a few years ago advocated scrubbing the vagina until it bleeds ever had to anesthetize their patients.

Quinine sulphate was administered by means of a Powdex insufflator, about 15 gr. to a dose. Picric acid (1 per cent solution) was painted thoroughly on the mucous membranes, and a vaginal cone containing 1 gr. of the acid was inserted in the vagina at night by the patient herself. Sodium bicarbonate was insufflated in the vagina with an ordinary Asepto syringe and a 50 per cent solution instilled by the patient at night also by means of an Asepto syringe. The treatment was continued throughout the menstrual period.

Of 176 positive cases in our series, 100 of the patients received treatment for one month or more. The remaining 76 patients either did not report for further treatment after the usual initial improvement, or were referred back to their private physicians, or were transferred to some other department. In 39 patients treated with quinine, 80 per cent gave good results. In 27 patients treated with soda, 80 per cent gave good results. In 35 patients treated with picric acid, 82.8 per cent gave good results. Recurrences in the quinine series averaged 30 per cent, in the soda series 18.5 per cent, and in the picric acid series 27.6 per cent. The twelve patients with gonorrhea were treated with silver nitrate baths to the cervix and

vagina, 8 of these patients being freed coincidentally of the gonococci and trichomonas, 4 having to be transferred to picric acid after the disappearance of the gonococci. These last four cases and five transfers from quinine to picric acid account for the apparent discrepancy in the above figures.

By good results we considered subsidence of symptoms, disappearance of trichomonads, return of the vaginal mucous membrane to normal, and vaginal smears containing only epithelial cells and the usual vaginal débris, this condition of normalcy being maintained throughout at least one menstrual cycle. Poor results we found could be attributed in all cases, except two, to irregular or insufficient treatment.

We classed as recurrences, cases where the vaginitis had definitely subsided, giving what we considered a good result, and suddenly recurred even if only to a minimal degree. Recurrences as a rule were much milder and yielded more easily to treatment.

There seems to be no established criterion of cure for these cases because of the tendency to recurrence. However, a period of six months without treatment, with freedom from symptoms and recurrences, seems to be a reasonable period of time for considering a patient as permanently cured. We find it very difficult to induce symptom-free patients to report for examination, so that only 44 were followed for six months or more without treatment. Of these, 16 belonged to the quinine series, 10 to the soda series, 18 to the picric acid series, with 81.2 per cent, 80 per cent, and 83.3 per cent respectively of permanent cures. One of our "cures" we have followed for two years; she has become pregnant and been delivered and has remained symptom-free throughout. On the other hand, we had another case that was a complete failure; she was treated long and assiduously without being able to free her of trichomonas or to relieve her of her symptoms. We were unable to determine whether or not her husband also was infected.

The number of treatments given before results were attained varied widely. Until the trichomonads disappeared and the symptoms definitely subsided, patients were treated twice weekly. After that, we found by experience that the best guide was the number of pus cells in the smears. When the pus cells became reduced to an occasional one or two in the field, we found that it was safe to let the patient report once a month for the postmenstrual check up.

We found no idiosyncrasies to quinine except two cases of increased menstrual bleeding. Picric acid gave us two reactions, but this treatment has the indisputable advantage of being able to be carried out at home by the patient herself. Sodium bicarbonate produced no other discomfort than a slight feeling of dryness in the vagina in one or two cases. The results in the three series were about the same.

SUMMARY

1. The incidence of *Trichomonas vaginalis* infestation of the vagina in women attending the Gynecological Clinics at the Woman's Medical College Hospital and the Woman's Hospital was studied. Of 1,018 cases examined, 176 or 17.3 per cent were found positive when examined by the wet smear method.

2. Of these positive cases 52.2 per cent gave as their chief complaint symptoms referable to the vaginitis.

3. All these positive cases had leucorrhea to some extent; 62.5 per cent had a typical *Trichomonas vaginalis* vulvovaginitis.

4. A series of 100 cases were divided into three groups and treated with quinine sulphate, picric acid, and sodium bicarbonate, respectively. The results were found to be about the same, averaging 81.2 per cent, 80 per cent, and 83.3 per cent, respectively, in terms of permanent cures.

DISCUSSION

DR. MARGARET C. STURGIS.—The pathogenicity of the *Trichomonas vaginalis* has not been uniformly conceded but it is agreed that where the vaginitis shows the clinical picture characterized by the brick red vulva and vagina, bathed with a frothy, yellowish discharge, accompanied by a varying degree of itching and burning, the *Trichomonas vaginalis* is always present in the discharge. The fact, too, that *Trichomonas vaginalis* vaginitis does occur in virgins leads to the opinion that the infection is of an endogenous character. Certainly there must be some general physical or local influence increasing the susceptibility.

It has been demonstrated that there exists in this type of infection an alteration in the pH in the vagina as well as in the actual tissue chemistry itself. Cruickshank and Sherman believe that overproduction of estrin is responsible for the non-infectious vaginal vaginitis. With this in mind I have attempted to find some clinical evidence manifested by irregularity in menstruation of an endocrine disturbance influencing the *Trichomonas vaginalis* vaginitis cases.

I have studied Dr. Angelucci's series of cases, classifying the positive cases according to their menstrual patterns. It was found that 14 per cent were not menstruating, 50 per cent had a normal cycle and 36 per cent showed some menstrual departures from normal. Thirty per cent of the total series had excessive menses.

Two hundred consecutive untreated cases admitted to the Gynecological Clinic of the Hospital of the Woman's Medical College, excluding those shown to have positive *Trichomonas vaginalis* vaginitis, were likewise studied as controls. Six per cent were not menstruating, in 48 per cent the menses were normal, 38 per cent showed excessive menstruation, and 8 per cent showed other menstrual disorders.

These figures are so nearly alike that one can only conclude that the character of the menses gives no evidence of an endocrine disturbance influencing the *Trichomonas vaginalis* infection. Therefore hormone therapy may at present be excluded from the treatment of this type of infectious vaginitis.

DR. EDWARD McLAUGHLIN.—My experience with this condition is restricted more or less to children and I would like to say that I have never seen a patient who has remained permanently cured.

If, as some think, the infection comes from infestation in the bowel, it would seem logical to give a thorough course of oral treatment against the parasites in the intestines, and thus eliminate the possibility of reinfection.

DR. A. E. RAKOFF.—It is well known that *Trichomonas vaginitis* is not typically a cervical infection. On the other hand, small numbers of organisms within the cervical canal and glands are frequently the source of reinfections. A thorough method of treatment should include an attempt to destroy organisms in this structure. At the Jefferson Hospital it has been our experience that no method of treatment is so effective as drying plus antiseptics. Drying alone has considerable trichomonicidal value. The use of antiseptic powders affords a convenient method of combining a mild drying effect with antiseptics. We have noted excellent results in the treatment of a large group of clinic patients by preliminary treatment of cervix, vestibule, and urethra, followed by the insufflation of a newly prepared pentavalent organic arsenical, aldarson.

DR. JOHN McGLINN.—Let me confine my discussion to a few practical points in the treatment.

A certain number of patients will get well with the vagina kept dry and the application of some antiseptic. Yet having tried all the blowers that have been made, I find there is no method so good as the insertion of the speculum and the pouring of the powder into the vagina.

The second practical point is that after a patient defecates, have her wash herself instead of using paper.

SYNCYTIAL DEGENERATION IN NORMAL AND PATHOLOGIC PLACENTAS

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IN PATHOLOGIC and histologic work on the human placenta the most confusing characteristic of the tissue is the great variety of different pictures that can be found within normal limits. In other words, it is extremely difficult to set a definite histologic criterion of what is normal and what is abnormal. It has seemed that there must be some constant histologic change in the placenta in eclampsia and preeclampsia which can be recognized. With that in view, I have tried many different types of stains on the placenta. With the aid of the Lee-Brown connective tissue stain, some thickening of the basement membrane of the syncytium of the villi was demonstrated in eclampsia and severe preeclampsia.¹ Following that, it seemed of interest to study the syncytium itself for any changes in the above conditions. After trying several stains, the ordinary hematoxylin and eosin stain seemed as satisfactory as any as a nuclear stain in this problem. It was found, as in all histologic work, that it was of extreme importance to have absolutely fresh tissue. Placentas were cut and very thin sections immediately put into alcohol-formalin fixing solution in the delivery room. Placentas, and especially toxemic ones, undergo degenerative changes very rapidly unless fixed at once.

The syncytium of the essentially normal placenta at or near term shows quite a characteristic picture.² The nuclei are oval and of constant size. They contain large granules of chromatin arranged peripherally and often suggesting the clocklike arrangement of the nuclear chromatin of the plasma cell. The nuclei are usually separated in the cytoplasm although distinct cell walls cannot be made out. They surround the entire villus and there are frequently wide spaces between individual nuclei. The syncytial cytoplasm is of even and definite width. It thins out over the finer capillaries where it also may contain no nucleus. The so-called "syncytial buds" or the solid masses of syncytial

cells growing out from the apex of the villi are not involved in the actual covering of the villus as are the other nuclei just described. The amount of proliferation and number of these syncytial buds vary markedly in different placentas, but no etiologic correlation can be found.

The normal syncytium as described is present in all normal full-term placentas and this is a very important point when we come to investigate the toxemic ones. In the former, in addition to the normal syncytium, one usually finds areas of syncytial degeneration, not very extensive, in some of the villi. This degeneration apparently first involves the nuclei of the syncytial layer of the villus. Again it should be emphasized that the syncytial buds are not necessarily involved in this degeneration. The nuclei show characteristically two types of changes which may be steps in the same process. One type found is the large swollen nucleus and the other the small pyknotic type. The small pyknotic nuclei tend to gather in clumps and apparently disappear by autolysis. Their disappearance leaves large areas of cytoplasm without nuclei surrounding the villi. This cytoplasm tends to become markedly narrowed and is often just a narrow band of hyaline-staining material. One can find villi with practically no nuclei left in their syncytial layer. Sometimes this degeneration appears while the blood vessels and stroma of the villus are essentially normal in appearance, and other times the stroma of the villus is markedly hyalinized and fibrotic. Apparently, as this syncytial degeneration is present in all placentas, it is essentially a physiologic process which progresses with the age of the placenta. The actual type of degeneration cannot be classified; it appears to be hyaline in type. No fat or glycogen can be demonstrated in the degenerating syncytium. According to Montgomery,³ this degeneration is physiologic and starts in the syncytium itself, and is caused by ferments in the maternal blood.⁴

In my series of seventeen eclampsias and one hundred preeclamptic toxemias a study of the placentas soon makes it apparent that this syncytial degeneration is markedly increased, both in the severity of the actual degeneration and in the total area of the placenta involved. There is also a fairly accurate correlation between the severity of the toxemia and the extent of placental area involved. For instance, in the cases of mild toxemia of pregnancy the increase in degeneration is not sufficiently marked to make an accurate histologic diagnosis. On the other hand, in the severe preeclamptic toxemias almost the entire placental area shows a syncytial degeneration to a marked degree. In eclampsia practically no normal syncytium can be found in the entire placenta; on taking sections from different areas the syncytial degeneration is found to be constant throughout. In cases of eclampsia of seven months' pregnancy practically complete syncytial degeneration is present, while a normal seven months' placenta shows almost no degeneration.

A method of comparing the syncytial degeneration of different placentas is making a count of the villi. It is of importance to count only

the small terminal villi as they are the villi most involved in this process. The larger villus stems show syncytial degeneration much later and even in eclampsia one can sometimes find fairly good syncytium on the large stems. Also the line between normal villi and early degeneration is hard to draw. Any villus showing syncytial nuclei, oval in shape with characteristic chromatin granules, and syncytial cytoplasm of normal width can be called normal. Villi containing any normal syncytial nuclei have been called normal in this work. The results of counting one hundred villi in all the placentas of this series have been of interest. The count on thirty-five normal full-term cases has shown from 10 to 40 per cent of villi showing syncytial degeneration. The average is 80 per cent normal villi and 20 per cent degenerated villi. In contrast to

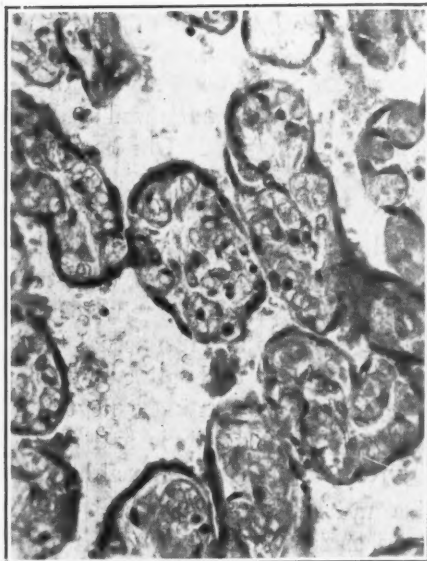


Fig. 1.



Fig. 2.

Fig. 1.—Normal syncytium showing oval nuclei properly spaced with cytoplasm of even and definite width.

Fig. 2.—Degenerated syncytium. Absence of nuclei, a few large swollen nuclei, some clumps of pyknotic nuclei undergoing autolysis. Cytoplasm much narrowed. Villus stroma in good condition. The plates were made from paraffin sections of about six microns. The contrast is more distinct under the microscope in thicker celloidin sections.

this the count on the eclamptic cases showed no patient with less than 90 per cent degeneration, and six patients with 100 per cent degeneration. The average count was 96 per cent degeneration. In counting the preeclamptic cases, 50 per cent degeneration was the lowest count found. The three patients with severe preeclampsia showed 100 per cent degeneration. The rest of the counts fell between 50 and 90 per cent degeneration corresponding roughly to the clinical symptoms.

In most of the cases of severe preeclampsia and eclampsia, the blood vessels and stroma of the villi seem to be in excellent condition with

very little hyaline change. This is of interest because it shows that the syncytial degeneration is the primary process. It seems reasonable, in view of the above findings, to assume that what is primarily a normal physiologic process in the normal placenta becomes a pathologic process when a sufficiently large placental area becomes involved. We know that only about one-fifth of the kidney tissue is necessary for life. Similarly only a part of the placenta may need to function for the continued health of mother and fetus. It is known that areas of infarction can

TABLE I

	VILLI WITH DEGENERATED SYNCYTIIUM	VILLI WITH NORMAL SYNCYTIIUM
Eclampsia 17 cases	90-100%	10- 0%
Preeclampsia 100 cases	50-100%	50- 0%
Normal 35 cases	10- 40%	60-90%

destroy large parts of a placenta without interfering with the health of the pregnancy. Severe syncytial degeneration involving the entire membrane of a villus is certain to interfere markedly with, if not destroy, its permeability and the metabolic exchange between mother and fetus. An irregular hypertrophy of the syncytium in toxemias has been described by Riviere,⁵ but I have not found this sufficiently constant to be of diagnostic import.

In studying the placentas of twenty-five cases of proved chronic nephritis hoping to find a difference between them and the toxemia cases, certain points of interest were noted. In two cases of severe nephritis with a blood pressure of over 200, the placental syncytium was found to be in very good condition. In these cases a differential diagnosis could be made. However, the other nephritic placentas showed marked hyalinization, fibrosis, and infarction of the villi, accompanied by syncytial degeneration. In these cases the stroma and blood vessels showed more and further advanced damage than the syncytium. In other words, the syncytial degeneration was a secondary process in contrast to being primary in the toxemia. This aids in the differential diagnosis in some placentas but in others it is extremely difficult to determine which is the primary process. Certain nephritic placentas can be recognized as such from the histologic picture, while others are extremely doubtful.

Of interest also, is the study of the so-called toxic and nontoxic premature separations of the placenta with regard to the syncytial degeneration. I agree fully with Montgomery⁶ that the separation of the low attached placenta should be excluded. Therefore, only the cases of *ablatio placentae* of which there was no question were considered. There were eighteen of these. The patients with definite toxemia showed toxic degeneration of the syncytium; others did not. One private case is of especial interest because the patient had had an absolutely normal preg-

nancy and had been seen two days previously, at which time she had a blood pressure of 100/68 and normal urine. She had a complete separation of the placenta while in bed at night, and the placenta showed an absolutely normal syncytial picture. This seems further evidence for the existence of nontoxic, nontraumatic separation.

Concerning the cause or importance of the syncytial degeneration in the toxemias and eclampsias little can be said. It is definitely a different process from infarction or necrosis of the placenta as described by Williams.⁷ The theory of Bartholomew and Kracke⁸ that a poison, possibly histamine, is absorbed from fresh infarcts, does not apply to this process, because the syncytial degeneration is independent of the actual infarcts themselves. Unquestionably, there is some lack of vitality of the syncytium or some poisoning by maternal or fetal products. I feel that it is of value as a method of histologic diagnosis of the severe toxemias.

SUMMARY

A study of the syncytium of mature placentas has been made in order to discover some constant change which might aid in the histologic diagnosis of the toxemias of pregnancy. A moderate amount of syncytial degeneration is present in all mature placentas. There is a definite increase in the severity and amount of this degeneration in the toxemias of pregnancy. The increase is slight in the mild toxemias but marked in the severe toxemias. In the cases of eclampsia it is practically universal. In nephritis syncytial degeneration is sometimes present but is secondary to the degeneration of the villi, while it is primary in cases of toxemia. The nephritic picture is often confusing and cannot be used as a differential diagnosis except in certain cases. In complete premature separation of the placenta the syncytial degeneration corresponds to the amount of toxemia present clinically and may be absent where no toxemia is present.

CONCLUSIONS

1. A moderate amount of syncytial degeneration is present in a mature placenta.
2. There is a definite increase in amount and severity of syncytial degeneration in the toxemias.
3. In the severe toxemias and eclampsias the syncytial degeneration is sufficiently marked to be of diagnostic value.

I wish to express my indebtedness to the Mallory Institute of Pathology of Boston for assistance in this work.

REFERENCES

- (1) Tenney, B., Jr.: AM. J. OBST. & GYNEC. 29: 819, 1935. (2) Iwanow: Ztschr. f. Geburtsh. u. Gynäk. 90: 631, 1927. (3) and (4) Montgomery, T. S.: AM. J. OBST. & GYNEC. 21: 157, 1931. (5) Riviere, M.: Gynéc. et Obstét. 22: 481, 1930. (6) Montgomery, T. S.: AM. J. OBST. & GYNEC. 28: 33, 1934. (7) Williams, J. W.: AM. J. OBST. & GYNEC. 41: 775, 1900. (8) Bartholomew, R. A., and Kracke, R. R.: Tr. Am. Gynec. Soc. 57: 83, 1932.

THE TREATMENT OF INCOMPLETE ABORTION

RESULTS IN 1,971 CASES

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THIS study is an effort to evaluate the results in the different forms of treatment of incomplete abortion as reflected in the records of a large general hospital. To this end all cases admitted to the Gynecological Division of the Kings County Hospital for the five years, 1930 through 1934, were reviewed, including all readmissions.

There were 1,971 cases. No case in which the period of gestation exceeded four months is included because these patients were admitted to the obstetric service and treated as premature labor, the technic of which differs considerably from the accepted routine on the gynecologic service.

The diagnosis in all cases was made by the history, findings on pelvic examination and by the gross demonstration of placental tissue; in the great majority of cases this was confirmed by a detailed pathologic report.

Treatment, where the procedure is possible, is essentially as follows: After a careful history, with emphasis on any invasion of the uterus, the patient is shaved, scrubbed, the vulva painted with tr. iodine, and draped as for a major operation. Using sterile gloves, a gentle bimanual examination is made to determine the size and position of the uterus, the dilatation of the cervix and presence or absence of adnexal pathology. If no adnexal pathology is present, the cervix is steadied with a tenaculum and the secundines removed with a smooth ovum forceps. The patient is then put to bed in Fowler's position, an ampule of pituitrin is given, followed by a course of ergot, usually one drachm every four hours for six doses.

After demonstrations of this technic by the resident, the work is done almost entirely by the internes, who change services every two months. An elevation of temperature is not considered a contraindication, in the absence of a history of repeated outside interference or of associated pelvic pathology. Gentleness in making the pelvic examination and in using the ovum forceps is stressed. Packs are rarely used, an occasional indication being where bleeding is moderate and the cervix not dilated enough to admit the ovum forceps. A curette is never used as it is felt that, while a simple intrauterine débridement to remove infectious material and promote drainage is practically

without danger, even in inexperienced hands, the trauma and massage of the uterine walls incident to the use of a curette are responsible for the poor results and consequent widespread condemnation of active interference expressed by authorities in this country.

Patients treated conservatively include those where the cervix does not admit an ovum forceps, where other gross pelvic pathology is present or where it is known that the uterus has previously been invaded. A history of interference is, of course, usually denied; nevertheless, all patients are questioned closely.

Conservative treatment includes the use of oxytocics, clyses, infusions, and occasionally transfusions. The intravenous drip has been of benefit in septic cases. Curettage was necessary in most of the conservatively treated patients, either before leaving the hospital or at a later admission.

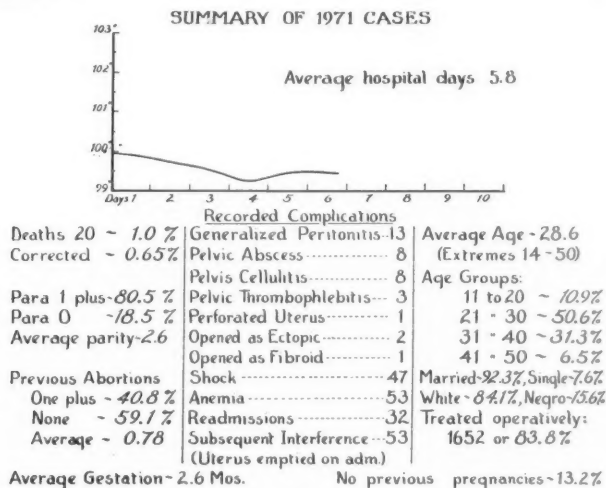


Chart 1.

In Chart 1, a summary of the entire series, it will be seen that the figures agree closely with those reported recently in other series. The temperature average presented here and in subsequent tables is based on rectal temperatures, so 99° was taken as a base line. The 53 patients requiring subsequent interference were those who, after removal of secundines by means of the ovum forceps on admission, were curetted before discharge for persistent bleeding.

In addition to these data may be added: Of 891 cases where the Wassermann was recorded, 43, or 4.8 per cent, were positive. Of 279 who admitted induction, 210 were self-induced, 35 were induced by midwives, 22 by physicians, and 12 "had abortions performed." The majority of the rest offered falls, exertion, worry, fright, and a host of other explanations for the abortion. Of the deaths, 17 out of 20 had the exact cause determined by autopsy.

In Chart 2 are listed all patients who were admitted with a normal temperature, with a comparison in average temperature range, hospital days, mortality, and complications between those of the group where the uterus was emptied on admission by means of the ovum forceps and those treated conservatively. It will be noted that of the patients treated conservatively, 132 required operative intervention before discharge, which was done on an average of 4.9 days after admission. Of the radically treated group, 19 required a second operative intervention, averaging 5.3 days after admission.

The value of "P" requires explanation. In the comparison of factors in unequal groups of a limited quantity an obvious source of error is that the observed difference may be due to chance rather than to an actual difference. Through the courtesy of Dr. A. T. Rasmussen, of the University of Minnesota, a formula used by Dunn for the deter-

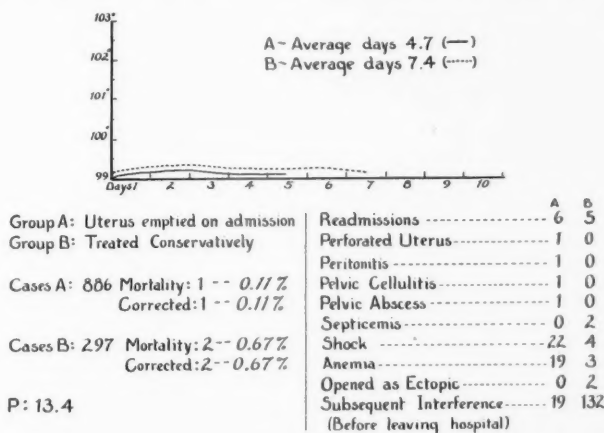


Chart 2.

mination of statistical significance of comparisons in limited samples was modified to apply to the problem at hand. The modification was in expressing the answer in parts of 100 rather than in fractions of one.

Substituting in the formula the total cases in each group and the mortality in each group, it is found that "P" equals 13.4, or that there are 13.4 chances in 100 that the difference in mortality in the two groups is due to chance or "random sampling" or limitation of the sample rather than to a true difference of statistical value. As for real statistical significance there should not be more than one chance in 100 that the difference is apparent rather than real; it is obvious that in this comparison the difference in mortality is meaningless.

MORTALITY

Group A.—(1) White, married, aged twenty-two, para i, gravida ii. Gestation, two months. Self-induced. Died in thirty-six hours. Autopsy: Perforated uterus; generalized peritonitis.

Group B.—(1) White, married, aged seventeen, para i, gravida iii. Gestation, three months. Self-induced. Died in four days. Autopsy: Septicemia following abortion. (2) White, single, aged sixteen, para 0, gravida i. Gestation, two months. Denied induction. Died in twenty-eight hours. Autopsy: Postabortal sepsis.

Chart 3 includes a list of those patients admitted with a temperature of 100°. It will be noted that the value of "P" is, in both instances, less than one; in other words, there is less than one chance in 100, in both the corrected and uncorrected mortality comparisons, that the difference is due to chance.

In Group A, 3 patients required subsequent interference after intra-uterine débridement on admission, on an average of six days later, while in Group B, 59 patients required operative intervention, averaging 5.4 days after admission.

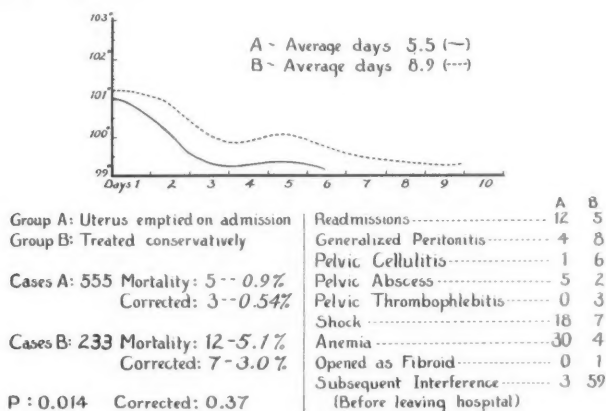


Chart 3.

The dramatic drop in temperature noted by Stewart, who quotes Pearce in this connection, occurred in many of these patients and seems to coincide with the emptying of the uterus, either spontaneously or by operative means.

MORTALITY

Group A.—1. White, single, aged thirty-one, para 0, gravida i. Gestation, three months. Denied induction. Admitted as acute appendicitis on surgical division. Abdomen opened, closed and uterus emptied in operating room. Transferred to gynecologic service and died in six days of acute generalized peritonitis. (Omitted in corrected mortality.)

2. White, married, aged twenty-three, para i, gravida ii. Gestation, 4 months. Denied induction. Uterus emptied on admission, packed. Again, same day, uterus invaded and patient repacked. Repeated a third time next day. Signed out eighth day; readmitted ten days later with temperature of 102°, and uterus invaded a fourth time. Death on twentieth day from peritonitis and septicemia.

3. White, married, aged thirty-one, para 0, gravida i. Gestation, three months. Denied induction. Entered in shock and did not respond. Died second day. Autopsy: septic abortion; generalized peritonitis.

4. White, single, aged twenty-two, para 0, gravida i. Gestation, three months. Induction by physician. Died twenty-two hours after admission. Autopsy: generalized peritonitis. (Omitted in corrected mortality.)

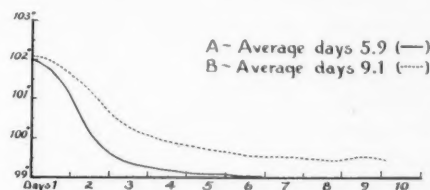
5. White, married, aged thirty-six, para i, gravida iii. Gestation, two months. Denied induction. Died fourth day. Autopsy: septic abortion; generalized peritonitis.

Group B.—1. White, married, aged thirty-two, para vi, gravida vii. Gestation, three months. Denied induction. Treated principally for lobar pneumonia. Died fourth day. Cause of death; lobar pneumonia. (Omitted in corrected mortality.)

2. Negro, married, aged thirty-three, para iv, gravida v. Gestation, three months. Denied induction. Operated first day as ectopic pregnancy. Died third day. Autopsy: septic abortion; generalized peritonitis.

3. White, single, aged thirty-one, para 0, gravida iv. Gestation, three months. Induction by physician. Died ninth day. Autopsy: septic abortion; generalized peritonitis.

4. White, single, aged nineteen, para 0, gravida i. Gestation, two and one-half months. Induction by midwife. Died sixth day. Autopsy: septic abortion; generalized peritonitis.



Group A: Uterus emptied on admission	Readmissions	3	2
Group B: Treated Conservatively	Generalized Peritonitis	2	4
Cases A: 161 Mortality: 2 -- 1.2 %	Pelvic Cellulitis	2	4
Corrected: 1 -- 0.62 %	Pelvic Abscess	4	2
Cases B: 139 Mortality: 8 -- 5.7 %	Pelvic Thrombophlebitis	0	2
Corrected: 5 -- 3.5 %	Shock	2	0
P: 0.37 Corrected: 0.93	Anemia	9	2
	Subsequent Interference	2	27
	(Before leaving hospital)		

Chart 4.

5. Negro, widow, aged thirty-seven, para ii, gravida iii. Gestation, two and one-half months. Denied induction. Treated principally for pneumonia. Died sixth day. Autopsy: lobar pneumonia. (Omitted in corrected mortality.)

6. Negro, married, aged thirty-seven, para ix, gravida x. Gestation, two and one-half months. Denied induction. Died sixth day. Autopsy: septic abortion, septicemia.

7. Negro, married, aged thirty-seven, para ii, gravida vii. Gestation, two months. Self-induced. Died tenth day. Autopsy: septic abortion, generalized peritonitis.

8. White, married, aged twenty-seven, para ?, gravida ??. Gestation, six weeks. Induced by physician. Died in three hours. Autopsy: septic abortion; generalized peritonitis. (Omitted in corrected mortality.)

9. White, single, aged twenty-two, para ?, gravida ??. Gestation, two months. Induced by physician. Died in three and one-half hours. Autopsy: generalized peritonitis following perforated uterus and sigmoid. (Omitted in corrected mortality.)

10. White, married, aged seventeen, para 0, gravida i. Gestation, three months. Denied induction. Died third day. Autopsy: septic abortion; generalized peritonitis.

11. Negro, married, aged thirty-six, para iii, gravida iv. Gestation, three and one-half months. Self-induced. Died forty-fifth day. Autopsy: pelvic abscess; thrombophlebitis, right leg.

12. White, married, aged thirty-four, para ?, gravida ?. Gestation, three months. Denied induction. Died in nineteen hours. Autopsy: septicemia; hemolytic jaundice; thrombophlebitis left ovarian veins. (Omitted in corrected mortality.)

In an effort to correct a source of error that might be found in the fact that some of the patients admitted with high temperatures were considered too sick to subject to any operative procedure and would thus fall in the conservatively treated group, all cases in Chart 3 admitted with a temperature of 101°, or higher, were listed separately and are summarized in Chart 4. In Group A every patient had a temperature of at least 101°, with several as high as 106°, at the time the uterus was emptied with the ovum forceps. Not one complication that could in any way be blamed on the procedure occurred in this group. Again it will be noted that the value of "P" is less than one in both instances. The deaths are detailed under the discussion of Chart 3. In Group A, Nos. 4 and 5; in Group B, Nos. 1, 3, 4, 6, 7, 8, 9, and 11.

CONCLUSIONS

1. There were 92.3 per cent of the patients in this series married and 80.5 per cent had had an average of 2.6 full-term deliveries, apparently indicating the need of wider contraceptive education.
2. Results of treatment of all cases compare favorably as to morbidity and mortality with other recently reported series.
3. Best results were obtained in that group of cases where secundines were removed and drainage established by the method described.

Cotte, G., and Gaté, J.: Three Cases of Persistent Ano-Genital Pruritus Treated Surgically, *Gynécologie* 34: 644, 1935.

The authors report three cases of stubborn anogenital pruritus which they treated surgically. They believe that in elderly women a vulvectomy should be performed, combined with removal of the clitoris and resection of the internal pudic nerves. However, in women who have an active sexual life and in those where the pruritus extends beyond the vulva and involves the anus, the buttocks and the perineum and also in men, resection of the internal pudic nerves may not only not suffice but may result in disturbances in the sexual function. For these cases the authors recommend resection of the pelvic sympathetic plexus and also of the peri-iliac hypogastric sympathetics. If during the laparotomy any abnormalities are found in the uterus or adnexa, these should be treated because there is no doubt that certain cases of pruritus have their origin in reflex hypogastric plexalgia which is due to intrapelvic disturbances or in a plexitis secondary to a pelvic cellulitis.

J. P. GREENHILL.

VARIATIONS IN GLYCOGEN CONTENT OF THE VAGINAL
MUCOSA AS A RELATIVE INDEX TO THE QUANTITATIVE
AMOUNT OF OVARIAN HORMONE AVAILABLE
IN THE ORGANISM

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THE principle of the "Schiller-Gram test" in the diagnosis of early cervical and vaginal malignancies has opened a most important means of determining the variations in ovarian (or possibly endocrine) function. This test is dependent on a chemical reaction of the iodine in the solution with the glycogen stored in the vaginal mucosa, including that of the portio.

To date a series of observations have been made with this test with some very interesting results. In our experience the normal mucosa of the portio vaginalis and that of the fornices takes the deepest stain indicating a storage of greater amounts of glycogen in these localities. Usually the mucosa of the lower one-half of the vagina takes very little stain or is negative. The mucous membranes in other parts of the body in both the female and male were found to be uniformly negative to this test. For purposes of evaluation and convenience we have classified our positive results as No. 1, No. 2, normal, and exaggerated, depending solely upon the density of the staining reaction.

A large series of cases consistently showed a negative or No. 1 reaction, in definite postclimacteric patients both physiologic and artificial. In a small series of prepubescent girls the reaction was likewise negative. In cases of so-called "artificial menopause" resulting from operation, the test was variable. Where the ovaries were definitely known to be absent either alone or as a part of a panhysterectomy, the results were invariably negative. In the cases following a supravaginal or total hysterectomy where the ovaries were left intact, our results were variable. Here many patients five to eleven years postoperative showed positive reactions, while others as recent as three to eighteen months following operation showed negative or only No. 1 reactions and were usually accompanied by annoying hot flashes and some noticed an increase in abdominal girth. The former were interpreted as representing cases where ovarian function persisted, while the latter those where the ovaries had degenerated or were degenerating.

At the present time we are attempting to utilize the test as a means of determining the effect of a subtotal or total hysterectomy on the length of viability of the remaining ovary or ovaries. We hope to record

Gram's reaction on patients before, and at regular intervals following simple hysterectomies to settle this question which at the present time is greatly contested. Our impression to date suggests that only a small percentage of residual ovaries become inactive within a short space of time, while the majority as shown by positive Gram reactions remain active for many years.

In numerous postclimacteric patients with a negative reaction, it was possible after a number of injections of concentrated follicular hormone, to obtain a normal Gram reaction. This would indicate that the presence of glycogen in the vaginal mucosa is dependent upon the presence of ovarian hormone in the organism. During pregnancy Gram's reaction was found to be a normal positive or exaggerated positive and was variable at different stages in the same individual. In the presence of uterine fibroids the reaction was highly positive. Amenorrhea patients gave variable reactions presumably depending upon the etiologic factor. As stated, amenorrheas of pregnancy were positive, those due to endocrine dyscrasias were negative as a rule, while one case following (intra-uterine) radium was positive. Those associated with constitutional diseases such as tuberculosis, malignancies, diabetes, anemias, etc., showed variable reactions. This group needs further study. Two patients with amenorrhea during lactation, one at nine months, and the other at eleven months postpartum gave negative reactions until the menses were resumed, and then became positive.

In one patient with a severe and persistent *Trichomonas vaginalis*, the vaginitis cleared up spontaneously during the course of a pregnancy only to reappear during lactation. Gram's test was negative during this latter period and even after menses were resumed became only No. 1. Here it appeared that increased ovarian hormone activity was a factor in checking the trichomonads during the pregnancy. Unfortunately we did not have the privilege of trying ovarian hormone therapy in this patient. In a large number of other patients harboring trichomonads, it was noted that Gram's reaction was negative or only mildly positive. As it has often been observed that the trichomonads proliferate greatly after the menstrual flow at a time when the body is very low in ovarian hormone, we attempted to treat these patients with one or more massive doses of follicular hormone in oil, three to five days before the expected menses and with very excellent results. Our results were especially good in preventing recurrences in cases where the trichomonad had apparently been eradicated by ordinary medication only to recur at a later date. Whether the improvement in checking the trichomonads in the presence of increased vaginal mucosa glycogen can be explained on the hypothesis that under these conditions the vaginal flora is returned to normal, we are not in a position to state. However, on the assumption of this hypothesis, it would logically follow that no drugs that would interfere with the

normal vaginal flora (chiefly Döderlein bacilli) should be used locally in the vagina. Or at best antiseptics should be used only temporarily continuing thereafter with only the ovarian hormone.

A positive Gram reaction in a woman who has presumably reached her climacterium because she has ceased flowing indicates that ovarian activity still persists. These are the patients who occasionally become pregnant long after the menstrual flow has stopped.

In cases of hypoplasia with oligomenorrhea the reaction varied from time to time indicating a change in ovarian activity, a positive reaction indicating that a menses was to occur within the near future. In women with suggestive early climacteric symptoms, it is an important confirmation to find a corresponding deficiency in vaginal mucosa glycogen.

Summarizing, we believe that the quantitative glycogen content of the vaginal mucosa is a relative index of ovarian function (or of the presence of ovarian hormone), that the Gram test may be an aid in making a differential diagnosis in cases of amenorrhea, that it suggests in what cases ovarian or other endocrine therapy is indicated, that it is valuable in determining the quantity of hormone necessary to fulfill physiologic requirements, and that it can be utilized as a check on the potency of the commercial hormone products. Further, it offers a means of determining the fate of the ovaries after simple hysterectomies. Finally, it indicates that the persistence of the *Trichomonas vaginalis* is associated with a deficiency of vaginal mucosa glycogen and suggests ovarian hormone therapy as a promising means of combating the recurrence of this parasite.

4753 BROADWAY

Adair, Fred L., and Davis, M. Edward: Chronic Atrophic Dermatitis of the Vulva, Surg. Gynec. Obst. 61: 433, 1935.

The present terminology: kraurosis, leucoplakic vulvitis, leucokraurosis, etc., is confusing and unsatisfactory as it describes only certain phases of this condition. It leads to failure in making a diagnosis of the early stages of the disease prior to the development of the shrinkage of kraurosis, or the white areas of leucoplakia. Chronic atrophic dermatitis of the vulva is a simple and descriptive term for the entire process in its various manifestations.

In a period of five years 23 patients with typical chronic atrophic dermatitis of the vulva have been encountered. Vulvectomy was done in 9 patients with uniformly good results. Various types of treatment were given, including radiation in the majority of the patients, with only temporary relief.

The disease is progressive and does not tend to regress spontaneously, although there may be periods of quiescence.

Surgical removal of the involved tissue is the only safe, logical, and effective treatment in alleviating the symptoms and arresting the progress of the disease.

The condition is to be regarded as a precancerous lesion, with an incidence of carcinoma in over 50 per cent of the cases. Vulvectomy is also justified as a prophylactic measure against carcinoma of the vulva.

WM. C. HENSKE.

SPONTANEOUS RUPTURE OF THE UTERUS

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THE literature reveals over two hundred cases of spontaneous rupture of the gravid uterus. The majority of these cases occurred in multiparas and a few in primiparas. The rupture has been attributed to hyaline degeneration of the uterine muscle, invasion of the muscle by fetal elements and by extensive round-cell infiltration, all of which predispose friability and such uterine musculature cannot withstand contractions during labor.

Appended are the records of three cases of spontaneous rupture of the uterus occurring during labor representing different types of injuries. All of the patients were operated upon with complete recovery. Complication of the operative procedure with eventual good result is seen in the first case.

B. W., aged thirty-seven, white, para ii, was admitted to the Jewish hospital at 2:45 A.M., Feb. 11, 1933. She had her last menstrual period on May 16, 1932 and was due approximately Feb. 25, 1933. She had had a spontaneous abortion of about five weeks' gestation three years before. Her prepartum course was normal. On admission she complained of pains every five minutes and had a bloody show and the cervix was about two fingers dilated. Vertex presented, the fetal heart was in the left lower quadrant and the maternal pulse was good. She was put to bed and at 3 A.M. the membranes ruptured spontaneously with cessation of pains. Falling asleep, she was awakened at 5 A.M. by severe lower abdominal pain and a heavy bloody vaginal discharge. The patient when seen by the resident was cyanotic, cold and clammy; pulse 140 and blood pressure 76/60. The uterus was spastic and three fingers below the ensiform process. Small parts were palpable on the left side and the fetal heart had disappeared. Vaginal examination revealed the cervix three fingers dilated, the placenta on the left side and just within the left edge of the cervical os.

Believing that the condition was that of placenta previa, podalic version was performed and a leg brought down to the vulva. 500 c.c. of 5 per cent glucose solution was given intravenously. The blood pressure was 104/84, red blood cells 2,800,000, and hemoglobin 66 per cent. A catheterized specimen of urine showed occasional red blood cells and many white blood cells. The patient was transfused twice, first 500 c.c. and then 750 c.c. of whole blood given, but only temporary improvement was noted. No further labor occurred, the uterus remaining spastic and tender. With the patient's condition poor and gradually becoming worse a diagnosis of rupture of the uterus was made and operation advised.

At 2 P.M. of the same day the abdomen was opened through a median suprapubic incision; a rupture of the uterus was found, extending along the right border practically to the fundus, dividing the layers of the right broad ligament which contained a blood clot the size of a grapefruit. The abdominal cavity was filled with a large number of clots. Buttocks and back of the fetus protruded through the rent. The uterus was rotated so that the rent lay anteriorly. A cyst of the left ovary the size of a baseball was also found. A six pound twelve ounce stillborn fetus was extracted. A supracervical hysterosalpingo-oophorectomy was performed, the clots removed and the leaves of the right broad ligament sutured. The patient was immediately transfused with 600 c.c. of whole blood and about an equal amount of 5 per cent glucose

solution. Length of the operation was thirty-five minutes, ether anesthesia was administered. The patient's general condition improved and pulse was 90 at the completion of the operation. Two cigaret drains were placed in the pelvis.

On the eighth day after operation the patient began to pass urine per vaginam. A retention catheter was inserted, but when removed leakage recurred. Filling the bladder to capacity brought no vaginal leakage, and a diagnosis of ureteral injury was then made. There was no leucocytosis at any time and the highest postoperative temperature reached 103° F. on one occasion on February 27. Vaginal examination about three weeks after operation showed the vaginal vault healing, with a slight induration in the right broad ligament. There was a thin fluid discharge from the vagina. The patient was discharged forty-one days after operation with instructions to return to the hospital.

On May 19, 1933 the patient was readmitted to the hospital because of dribbling of urine from the vagina and because of having experienced several attacks of chills and fever along with pain in the right lower quadrant which radiated to the right side of the back and to the loin. On admission the patient's temperature was 104.6° F. and evidences of a pyelitis were present. Intravenous pyelography at this time revealed normal function of both kidneys. There was a mild right hydronephrosis and the right ureter was dilated along the entire course. The lower half of the right ureter was not visualized, especially at the insertion into the bladder. Cystoscopy showed that the right ureter was obstructed 5 cm. from the bladder. Indigo carmine injection into the circulation was followed by passage of the dye into the vagina. The temperature having returned to normal and the pyelitis cleared up repair of the injury was now deemed to be safe.

The patient was again operated upon June 10, 1933. An extraperitoneal incision in the right iliac fossa was made and the lower half of the right ureter was exposed. Around the lower end there were marked adhesions which were freed. The distal 1½ cm. of the proximal portion of the right ureter was split longitudinally and the free end was introduced into the bladder through a transverse incision and anchored in such a manner that the split cuffs of the ureter were separated transversely and approximated to the bladder mucosa allowing complete patency of the artificial orifice. Right ureteral and bladder catheters were inserted. Cigaret drains were left in the abdominal wound and later removed.

Passage of large quantities of urine followed immediately after the operation. The highest postoperative temperature was 101.8° F. on the second day. Sixteen days after operation the catheters were removed, followed by voidance of urine spontaneously with a slight residual lasting only a few days. Pyelogram done four weeks after operation revealed the right hydronephrosis distinctly less. The insertion of the right ureter into the bladder was external to the normal site. The patient was discharged on the forty-third day after operation with no complaints and repeated checkups have shown her entirely free from symptoms or signs of fistula. Repeated intravenous pyelograms revealed disappearance of the hydronephrosis and the new ureteral opening functioning.

COMMENT

1. On reviewing the history of this case, it is apparent that rupture of the uterus occurred at the time the patient was awakened from her sleep by severe abdominal pain accompanied by vaginal bleeding, at which time the patient went into shock. This was some time prior to the podalic version, and the diagnosis of placenta previa was evidently erroneous.

2. Ureteral injury was sustained because of extreme stretching of the right ureter due to distention of the right broad ligament by blood and clots. This is evident because generally where the ureter is either severed or included in the suture in the course of an abdominal operation the ends retract, often to such an extent that it is

impossible to reimplant the ureter into the bladder on account of the shortening of the proximal portion which has occurred. In this case it was found after freeing the ureter from the adhesions that the ureter was normal in length.

3. Catheterized specimen of urine before the operation showed the presence of red blood cells.

The second case, M. B., white, aged thirty-four, para iv, was admitted to the Jewish Hospital of Brooklyn Feb. 13, 1934. Last menstrual period was May 16, 1933 and estimated date of confinement was Feb. 23, 1934. The patient had an induced abortion at seven weeks some fourteen months previous and bled for four months intermittently, after which a curettage was done and decidual tissue was obtained.

On admission she had irregular pains and vaginal examination showed the cervix to be elongated, uneffaced, and hard. She was moderately anemic, the hemoglobin during pregnancy being 57 per cent. The fetal heart was irregular, ranging between 62 and 170. No cord was felt in the vagina. Vertex was dipping and the membranes ruptured with meconium-stained discharge. After eight hours of mild labor, the patient suddenly had three strong contractions with bearing down sensation; pulse was 112 and condition fair. Rectal examination revealed no cervix palpable, head was at the spines, and there was slight vaginal bleeding. The fetal heart had disappeared about an hour prior to this time and could not be heard thereafter. During the next hour, the uterus was in moderate tonic contraction, but no distinct labor pains were noted. Examination showed the head almost on the perineum. Pituitrin minims three was given without producing any uterine contractions. An easy low forceps delivery was performed and a stillborn fetus weighing 6 pounds 12 ounces was delivered with two loops of cord wound around the body. The placenta was expelled immediately after the extraction of the fetus, having apparently been separated for some time.

Because of the bleeding, vaginal examination was made and a laceration of the cervix was found on the left side, extending up into the uterus and into the peritoneal cavity with a small piece of omentum protruding into the vagina. As this was repositioned, the patient went into shock; pulse 160 and blood pressure 70/50. Morphine sulphate $\frac{1}{4}$ gr. by hypo and an intravenous injection of 500 c.c. of 10 per cent glucose solution were given with some improvement. The patient was immediately transferred to the operating room and a laparotomy was performed. A rent was found in the uterus, extending along the left lateral aspect from the cervix halfway to the fundus. The cervix was thinned out, the uterine wall was about 4 cm. thick, and the lining of the endometrial cavity was red and shaggy. The entire cervix and canal were discolored, reddish purple, almost gangrenous in appearance. There was considerable extravasation of blood into the broad ligaments and into the peritoneal cavity. A supracervical hysterosalpingo-oophorectomy was performed. The patient was given a transfusion of 750 c.c. of whole blood and reacted very well, blood pressure climbing steadily and pulse dropping. A blood count revealed 2,000,000 red blood cells, hemoglobin 40 per cent, gradually increasing to 4,000,000 cells with hemoglobin 60 per cent. White blood count was normal. The patient made an excellent uneventful recovery with primary healing of the abdominal wound and left the hospital three weeks after the operation.

The third case demonstrates the compression of the lower segment between the presenting part and the bony pelvis. H. S., aged thirty-nine, white, para i, a forceps delivery ten years before and had three miscarriages since. Uterine suspension was done six years prior. The estimated date of delivery was Feb. 20, 1933. The patient was admitted to the Jewish hospital, Brooklyn, Feb. 13, 1933, labor having begun at 9 P.M. the night before. The blood pressure was 172/96, and slight edema

with a trace of albumin in the urine were present. Pains were very strong, every two or three minutes. A vaginal examination done at home showed the cervix almost fully dilated, except for a palpable anterior lip. On consultation, there was found a marked retraction ring just below the umbilicus. There were two abdominal scars, one longitudinal, the other transverse, the latter being the site of repair of an umbilical hernia. Rectal examination revealed the head at the brim of the pelvis with caput dipping. The fetal heart was not heard, the patient's pulse was 130, temperature normal. The case was considered as an impending rupture of the uterus and was ordered transferred to the operating room.

Examination on the operating table revealed that the retraction ring had disappeared. The fetal parts were easily felt and the diagnosis of rupture of the uterus was therefore made. A left paraumbilical incision was made two inches above and three inches below the umbilicus, the fetus was found in the abdominal cavity. There was very little free blood present. A stillborn fetus was extracted and the uterus was discovered to be ruptured across the lower segment, entirely separated from the bladder attachments and attached only posteriorly. The rupture extended downward on the left side to the cervix. A supracervical hysterosalpingo-oophorectomy was performed, two cigaret drains were inserted into the vagina through the vaginal stump, and the stump was peritonized. The time of the operation was forty-five minutes under ether anesthesia. The patient had an uneventful postoperative course; the highest temperature reached was 101.4° F. on the second day after operation. The patient was discharged eighteen days after operation, general condition was good, the abdominal wound was well healed and there were no exudates in the pelvis or parametria. Follow-up examinations showed the patient's only complaint was that of a mild menopausal syndrome.

849 PARK PLACE
115 OCEAN AVENUE

PEPTIC ULCER COMPLICATING PREGNANCY

F. W. MULSOW, M.D., AND W. E. BROWN, M.D., CEDAR RAPIDS, IA.

IT IS generally considered that pregnancy exerts a favorable influence upon peptic ulcers. The infrequent reports of peptic ulcer as a complication of pregnancy and the rapid development of serious symptoms and death, has prompted us to report the present case.

Hurst and Stewart¹ have, in their book upon peptic ulcer, one paragraph devoted to a discussion of the influences of pregnancy upon peptic ulcer. They suggest that the relief of symptoms of ulcer is principally due to support of the stomach by the rising uterus. The tension on the lesser curvature of a long stomach is thus relieved and the improved circulation promotes healing of these ulcers.

Szenes² attributes the relief of discomfort from peptic ulcer in pregnancy, to the lowered acidity of the gastric juice, change of the position of the stomach by the enlarged uterus and by a general gain of weight with increased deposits of fat around the stomach.

Hemorrhage as a complication of duodenal ulcer is of more frequent occurrence in women than in men. Most authors consider that the percentage of cases of duodenal ulcer with severe hemorrhage is about twice as great in women as in men. Also death from hemorrhage from peptic ulcers occurs in a higher percentage of women than men. But death from an acute hemorrhage in these cases is one of the less frequent complications.

CASE REPORT

Mrs. S., aged forty-one, was admitted to St. Luke's Hospital in the thirty-fifth week of gestation, vomiting a brownish fluid and complaining of pains in the lower abdomen and back. She was a rather frail woman. She was 5 feet 5 inches tall and for several years had weighed from 100 to 105 pounds but had increased to 130 pounds during pregnancy.

The past history was essentially negative except for chronic constipation, which had troubled her considerably during the pregnancy. This was her first pregnancy, and she had considerable nausea and vomiting during the first three months. A diagnosis of twin pregnancy was made about the fifth month. She complained at about the seventh month of a few sharp pains along the right costal margin which radiated to the back. She was advised at this time that this was probably gallbladder disease, but she made no further complaints after a few weeks of the trouble.

During the past three months she had complained of burning sensations in the epigastrium, occasional nausea, moderate flatulence, and considerable distention of the abdomen. There was some edema of the lower extremities during the past few months although the findings in the urine and the blood pressure readings were normal.

About four hours before entrance to the hospital she became nauseated and vomited large amounts of bright red blood, and large quantities of tarry stools were passed. Upon entrance she was vomiting a brownish fluid and complaining of irregular pains in the lower abdomen and back. She continued to have nausea and vomited small quantities of blood at frequent intervals. Definite labor pains began a few hours later. The blood examination at this time gave a red count of 3,160,000 and a white count of 8,900. The pulse varied from 110 to 120. She was kept at rest and given small amounts of fluids.

The labor pains progressed slowly and her general condition was gradually getting worse. She was delivered of twin girls by version and extraction with the loss of very little blood, about twenty-four hours after the onset of bleeding. She was given blood by transfusion and 7 per cent gum acacia intravenously, but her condition steadily became worse and she died about ten hours after the delivery. The babies were apparently normal although premature; they have continued to grow normally.

At the necropsy the small intestines and cecum contained large quantities of tarry material characteristic of partly digested blood. In the posterior wall of the duodenum about 2 cm. beyond the pyloric ring was an ulcer about 1.5 cm. across by 1 cm. in depth. The floor of the ulcer contained a blood clot and a small eroded artery. The margin of the ulcer was very firm. The wall of the gallbladder was thin and contained many small yellowish faceted calculi. The uterus was characteristic of one day postpartum and contained about 50 gm. of placental tissue adherent to the posterior wall with a small amount of blood clots. Other viscera were very pale and anemic.

The anatomic diagnosis was duodenal ulcer with massive hemorrhage, generalized anemia, cholelithiasis, and puerperal state. The causes of death were given as hemorrhage from duodenal ulcer and obstetric shock.

SUMMARY

Varicose veins of the esophagus or gastric neoplasm were considered as the most probable source of the bleeding. Peptic ulcer as the source of the bleeding was considered but was thought to be very unlikely because of the absence of complaints

and the rarity of ulcers during the pregnant state. Peptic ulcer is a very rare complication of pregnancy, but death from hemorrhage of a duodenal ulcer during pregnancy is an exceedingly rare condition and no previous case report could be found in the literature.

REFERENCES

- (1) *Hurst, Arthur F., and Stewart, Matthew J.*: Gastric and Duodenal Ulcer, Oxford Medical Publications, Sept., 1929, p. 153. (2) *Szenes, A.*: Milleil. a. d. Grenzgeb. der Med. u. Chir., Jena 37: 652, 1924.

513 HIGHLEY BUILDING

THE VALUE OF THE TRENDLENBURG POSITION FOR OCCULT PROLAPSE OF THE CORD

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THERE is a widespread, generally accepted teaching that marked disturbance of the fetal heart is an indication for immediate delivery. The tacit acceptance of this teaching, I believe, is open to grave question. The rapid delivery of a child already distressed invites disaster. More careful consideration of the causes for disturbance in the rate and rhythm of the fetal heart during labor will eventuate in greater conservatism in the handling of this complication. In general, disturbances of the fetal heart occur practically always at the time when the head is descending into the pelvis. The distress of the fetal heart, therefore, may be due to undue pressure on the fetal head, or pressure on the cord.

Undue pressure on the fetal head as a cause of fetal cardiac distress is less frequent now, as disproportion is often anticipated and cesarean section employed. Excessive compression of the fetal head frequently results from forceps extraction when traction is made too hastily and too forcibly. The effect of the use of large doses of pituitrin is too well known to need comment.

In considering interference with cord circulation, or fetal distress from pressure on the cord, many differential possibilities present themselves.

- a. Frank prolapse is an obvious cause.
- b. Short cord or entanglement of the cord with some portion of the body rarely interferes with the fetal circulation until the head is on the perineum, and even then is not a frequent cause of distress.
- c. Occasionally the cord is wound around the arm in the axilla. As the head descends into the pelvis the arm is compressed against the side of the chest by contraction of the circular fibers of the uterus. During

a contraction the heart will become slower than the usual physiologic slowing, and the normal rate may not return at the end of the contraction. As the labor advances, this decrease in the rate becomes more marked until it threatens the life of the fetus. Under such circumstances podalic version would offer the best chance of saving the baby.

d. Finally, occult prolapse is not usually of clinical significance until the beginning of or during the second stage of labor. The prolapse is usually due to some malposition of the head or some type of pelvic deformity, as in a flat pelvis, where the cord falls into some unprotected part of the pelvic ring, as in one of the bays beside the promontory. As the head descends into the pelvis and rotation takes place, the cord may be caught between the head and the pelvic wall, the fetal heart becoming slow and irregular. This irregularity must be distinguished from the physiologic slowing during a contraction.

In many years of observation I have occasionally had the experience of observing marked slowing of the fetal heart. Either by a policy of inactivity or by immediate delivery, as usually advocated, the results were almost equally bad. In trying to solve the problem one is at once confronted with the question of cause. The conviction has grown on me that occult prolapse is a more common cause for fetal heart distress than is generally appreciated. In identifying this complication as a cause for fetal heart distress, the Trendelenburg position, in my hands, has proved an invaluable aid. In frank prolapse of the cord the advantage in the elevation of the hips is recognized to assist reposition and maintain it after replacement, by the force of gravity. The same principles should apply to occult prolapse.

In the interval between pains, when the hips are elevated, the cord will slip back, and when the contraction occurs the head will be forced more tightly into the pelvic cavity. If, therefore, when the fetal heart shows distress, the patient is put in the Trendelenburg position, the attendant often will be rewarded by a return of the usual rate and rhythm. The position should be maintained during several contractions, and if the rate remains normal, the hips can be lowered gradually while the fetal heart is carefully watched for any return of the irregularity. If the pains are weak the forceps may be applied in the elevated position and moderate traction made. If, under these circumstances, the fetal heart shows slowing, it may be that the cord is compressed between the blade of the forceps and the head. If the fetal heart remains regular, the hips may be gradually lowered, the subsequent delivery being managed slowly and conservatively with the feeling of assurance that there will be no undue trauma to cause injury to the fetal head. After the diagnosis of occult prolapse of the cord is made, some obstetricians would prefer version to get the cord out of danger, but one might hesitate to do that if the membranes had been ruptured for several hours.

Rapid delivery of a child that is already distressed invites disaster from excessive compression of the head. Usually, if the delivery is sufficiently rapid to secure the birth of a living child, the child may be so asphyxiated as to make resuscitation difficult. If the child lives, it often will be found later to be suffering from cerebral hemorrhage. Many of the standard delivery tables are not equipped with any device for securing the Trendelenburg position. Time is lost and some ingenuity is required in working out a substitute.

4105 LIVE OAK STREET

LIGATION OF BOTH URETERS, UNILATERAL NEPHROSTOMY, RECOVERY

NATHAN I. SLUTSKY, M.D., BROOKLYN, N. Y.

WHILE ligation of a single ureter may give so few symptoms as to be frequently overlooked, the ligation of both ureters is usually a tragedy. The literature on the subject is so scant as to give the impression that its occurrence is rare. Recently, William E. Stevens reported more than 27,000 admissions to the San Francisco County hospitals with but 5 cases of ureteral injury. On the other hand, eleven years ago, Leon Herman reported 86 injuries in 2,225 pelvic operations. The latter figure, I believe, is rather high but probably more nearly approximates the actual occurrence.

Within the past year two cases came under my observation. The first, a woman aged forty, was operated upon for multiple fibromas of the uterus. It is the custom of that operator to insert a Pezzer catheter at the conclusion of such operation. He noted complete anuria for forty-eight hours. Cystoscopy revealed a complete blockage to the upward passage of the ureteral catheters about $2\frac{1}{4}$ inches from the ureteral orifices. No secretion came through the catheters and indigo carmine given intravenously failed to show at the end of one-half hour. In this case, the operator reopened the original incision and a prolonged search for the culprit ligatures was made. The operation, as usual, was time-consuming in spite of the fact that we had introduced catheters in both ureters up to the point of stricture. The search is always fraught with difficulties, because there is the usual plastic exudate and the incidental bleeding on opening the approximated layers of the broad ligaments as well as distortion of the field of operation. In this case the ligatures were found and deligated, but in spite of heroic treatment, including blood transfusion, the patient died immediately from shock.

The second case was that of Mrs. J. A. (Case No. 65218), who was admitted to the Beth Moses Hospital on Sept. 20, 1934. She was a frail, somewhat pale, white woman aged forty-three, whose chief complaint was vaginal bleeding twice a month and a steady enlargement of the abdomen. Examination revealed an abdominal enlargement equal to about the eighth month of pregnancy. Because of the many cystic and hard areas fetal parts were simulated to such an extent that an Aschheim-Zondek test was done as well as x-rays taken to dispel the diagnosis of pregnancy and to confirm the diagnosis of fibromyomas with cystic degeneration. The patient's previous history was irrelevant except that eight years ago a pregnancy was interrupted because of an abdominal tumor discovered on that occasion. One year later she was delivered by cesarean section.

On admission the blood count was, erythrocytes 4,800,000, hemoglobin 80 per cent, polymorphonuclears 68 per cent. The urine was negative for pus, albumin, and casts. The operation was accomplished through a midline incision. Because of mechanical difficulties it lasted about one and one-half hours. The findings were a large intraligamentous tumor which filled the entire abdomen up to the xyphoid cartilage. The uterus was normal in size, the adnexa negative. During the operation the bladder was injured and repaired. At the conclusion of the operation a Pezzer catheter was introduced into the bladder. This last procedure is strongly recommended because it not only keeps the bladder collapsed and the operative region immobile but it also gives early information concerning urinary secretion.

During the next thirty-six hours no urine drained per catheter and the patient was taken up for a cystoscopy. Attempts to pass the ureteral catheters showed impassable obstructions about 2 inches from the ureter orifices. Indigo-carmin showed no return. Diagnosis of bilateral ligation of ureters was made and a unilateral nephrostomy was decided upon. Accordingly, the patient was placed on her left side in the usual kidney position. A right oblique lumbar incision was made beginning at the twelfth rib in the posterior axillary line and extended about 5 inches downward and inward. The muscles were cut in line with the incision and the kidney was exposed. Through a small incision in its outer border a curved Kelly clamp was thrust through the tissues and into the pelvis of the kidney. A considerable amount of a bluish fluid (urine discolored by indigo-carmin) gushed from the wound. A Pezzer catheter was inserted. This was held in place by a No. 1 chromic suture taken through the kidney and through the tube at the level of the abdominal incision. A cigaret drain was then inserted in the wound and the latter was closed in layers.

The patient was given direct blood transfusion, 350 c.c. She reacted well. Her temperature, however, which was 102° the previous night rose to 103° but rapidly returned to normal within the next four days. During this time the pulse ranged between 130 and 96. For the first forty-eight hours there was very little secretion through the nephrostomy tube but on the third day a flood of urine was excreted, saturating the bed. This profuse drainage continued until the eighth postoperative day when a bloody fluid having the odor of urine was removed from the bladder by catheter. Thereafter the quantity of urine voided increased very rapidly, the patient excreting from 62 to 91 ounces each twenty-four hours. Drainage through the nephrostomy wound decreased to almost nil and the tube was removed on the twelfth postoperative day after which the wound granulated rapidly.

On the twentyfourth postoperative day a cystoscopy was done and again both ureter catheters met with obstruction at the same level as before the nephrostomy, but urinary drainage was free and the indigo-carmin was recovered from both sides within five minutes after intravenous injection of the dye.

On the thirty-fifth day after her admission the patient was discharged from the hospital. Two months later she was seen at my office. She had gained in weight and strength and was apparently in good health. A cystoscopic examination on this occasion disclosed the ureter catheters had passed to the pelves of both kidneys without meeting with any obstruction.

DISCUSSION

When both ureters are ligated active interference is imperative. Hyperazotemia is rapid and extreme and uremia is impending. Renal elimination must be established. Unilateral nephrostomy can accomplish this with the least operative trauma. Ordinarily the duration of an operation is only a minor factor in the eventuality,

but when one considers that these patients are gravely ill, having just undergone a major operation, any additional manipulation or operative procedure should be vigorously eschewed.

As to the treatment of bilateral ligation of ureters, the textbooks shed very little information. Most books do not even mention it as a complication in pelvic operations. All older authors advise deligation when the condition is recognized. Clark D. Brooks reported a case in 1934 in the *Journal of the Michigan State Medical Society* on which he did a double nephrostomy in 1910. He operated upon the patient at her home in bed, under local anesthesia, and recovery was complete. Robert V. Day reported a case in 1930. Caulk reported on experimental work in the *American Journal of Surgery and Gynecology* in 1920. But, apparently, no one contented himself with a unilateral nephrostomy which, obviously, requires less than one-half the time of the bilateral procedure and therefore is half as hazardous.

After a unilateral nephrostomy has been accomplished the operator can rest at ease and await developments. Whether he decides to implant the ureters into the colon or even attempt deligation, one or two weeks later finds the patient a much better risk.

1286 PRESIDENT STREET

PITUITARY SHOCK

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FROM the paucity of cases recorded in the literature, one would conclude that pituitary shock is a very rare occurrence. Prior to an article by Hasson¹ there were no reports of this condition. Since then Wang and Maxwell,² Byrd,³ and Simon⁴ have each described one case. Because of the universal and constant use of posterior pituitary extract, however, there must be more instances of anaphylaxis or shock following its administration. Simon⁵ has observed three cases in addition to his recorded one, and a correspondent from the Philippines to the A. M. A. describes allergic phenomena following the injection of solution of pituitary in a patient at two successive deliveries.⁶

The case reported here did not show any of the allergic phenomena that have been recorded.

L. S., primigravida, aged twenty-one, was admitted to the obstetric service Oct. 28, 1934, with a history of slight vaginal bleeding and abdominal cramps which had begun a few hours before. She said she had passed masses of tissue which, from the description, were fetus and placenta. From the history the duration of the pregnancy had been about four months.

Physical examination showed a well-nourished, not anemic looking, female evidently not having much pain. The heart and lungs were negative. There was very slight vaginal bleeding. Two hours later pituitrin (Squibb's) 0.50 c.c. was given, followed at half-hour intervals of the same amount for three doses. About twenty-five minutes after the last dose, it was noticed that the patient was very pale and had air hunger. Blood pressure was 85/60. Shock measures were instituted at once, which included 1,000 c.c. of 10 per cent glucose intravenously. It was thought that perhaps she had been bleeding more than we had suspected.

Careful questioning and checking up and the immediate return of the patient to her former status soon dispelled this fear, however. Pituitrin was then casually thought of as being responsible.

About two hours later the patient was taken into the examining room for a speculum examination. Without anesthesia, a small piece of placenta was removed from the open cervical os and the vagina was packed lightly. Routinely, afterward, 1 c.c. of pituitrin was given. Five minutes later the patient cried out that she was dying; she was gasping for air and her color was deathly white. Blood pressure was not recordable. Remembering the events of the morning, pituitrin was known to be the malefactor. Adrenalin 7 min. (1-1,000 sol.) was given immediately with caffeine, and in a short time she was normal again.

The packing was removed the next day, at which time she was in good condition, and with a normal blood pressure. The rest of her recovery was uneventful.

This report is not an indictment of pituitrin or its use, but rather an attempt to show the necessity for intelligent administration of this valuable drug. Often, when there is more than the usual amount of bleeding postpartum, the attending physician will inject ampule after ampule of pituitrin, and also, if means are at hand, he may give an inordinate amount intravenously. DeLee recommends not more than two Voegtlin units or 3 minims of a standardized preparation should be injected intravenously.

As to the treatment of pituitary shock, Melville⁷ has demonstrated ephedrin and adrenalin to be specific in their action. Adrenalin is preferable.

REFERENCES

- (1) *Hasson, J.*: Brit. M. J. 1: 242, 1930. (2) *Wang, P. W., and Maxwell, J. P.*: Chinese Med. J. 47: 66, 1933. (3) *Byrd, H. G.*: Va. Med. Monthly 61: 1935. (4) *Simon, F. A.*: J. A. M. A. 104: 996, 1935. (5) *Simon, F. A.*: Personal communication to author, Apr. 10, 1935. (6) *J. A. M. A.* 105: 904, 1935. (7) *Melville, K. I.*: J. Pharmacol. & Exper. Therap. 47: 355, 1933.

413 MASONIC TEMPLE

Theron, C. P.: Some Mistakes I Have Made, South African M. J. 9: 35, 1935.

The author cleverly relates a number of mistaken diagnoses in pregnancy and treatments during twenty-seven years of general practice. Among his records are cases of spurious pregnancies, or phantom tumors, endocrine disturbances and acute abdominal conditions leading to mistaken diagnoses. Of similar import are mistakes in prognosis and in treatment.

A case is reported of a laparotomy performed for appendicitis and ectopic pregnancy on the right side. Within a few hours after the operation the patient presented new symptoms caused by a ruptured tube on the left side. This mistake was due to being over-cocksure that the pathology was all on the right side.

A note of warning is sounded against such pitfalls.

F. L. ADAIR AND S. A. PEARL.

Special Article

CHARLES DELUCENA MEIGS

A LEADER IN AMERICAN OBSTETRICS

HERBERT THOMS, M.D., NEW HAVEN, CONN.

I ONCE heard Whitridge Williams remark that Charles D. Meigs was a great man in spite of the fact that he was usually on the wrong side. There is much truth in this statement, and when we consider the strenuous opposition of this leader in obstetrics to the use of anesthesia in childbirth, the transmissibility of puerperal infection, and the operation of ovariectomy, it is not difficult to understand why so much of his good has been interred in his bones. In spite of this, however, we shall make no mistake in saying that Charles Delucena Meigs is a truly great figure in American Obstetrics and no survey of that subject can omit him from the roster of those who contributed greatly to its development. Meigs' contribution was that of a great teacher who devoted his life to the elevation of the standards of instruction and practice of obstetrics.

When we look in retrospect to medical instruction in this country during the first half of the nineteenth century we see in its practice a good deal of the reflected glory of that aureate period in our history. However, before we allow ourselves to become too critical of the methods used in teaching at that time we would do well to remember that the sentimental effusiveness and positive assertiveness which characterized the America of that day were intermingled with an energy and vitality which has not been seen in this country before or since. The teacher of medicine in those days in spite of his high sounding oratory and ostentatious manner was an essential force in that important period when our nation's character was forming. These were the years, points out Professor S. T. Williams, in which were developed those "qualities which, although we share them with other nations, we have come to call 'American': resourcefulness, self-reliance, energy, belief in equality, freedom in religion, sense of manifest destiny, in short, apart from its absurd connotations, American idealism."

Charles D. Meigs was not only a product of this era but in its medical aspects he was a dominant part of it. We may indeed smile as we picture him in all the drama of his lecture room but we would have liked to have been among his auditors. An eye witness has left us

this description, "His entrance into the lecture room, is that of an easy and polite visitor to a lady's parlor. His gestures are simple, unstudied and (proof of their truthfulness) never strike the listener as theatrical or artificial. His imagination bodies forth his illustrations at once beautiful and chaste, and his voice, which is not strong, is yet clear and distinct. His playfulness of manner, general simplicity and unaffectedness of style, produce a naïveté which is very winning. At one time, he exhibits all the simplicity of a young girl; at another, the dignified port of the gentleman; and again, the tedious whinings of the poor invalid female. The lecture room gradually fills, before

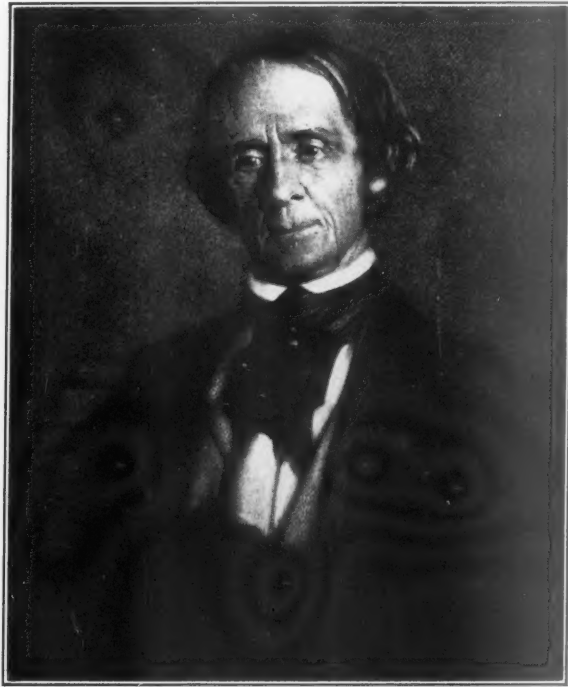


Fig. 1.

the hour of lecture, until it is entirely full, of an audience at once ready to smile, laugh or weep, at the bidding of the accomplished teacher." However much he was a showman, Meigs by his sincerity and seriousness of purpose impressed his hearers with the worth and dignity of his subject.

The true spirit of Meigs is found in his *Letters to His Class* published in 1848. Here we see his extraordinary erudition and broad culture, in language so characteristic of that period in our history. The following is a sample which should whet the appetite of those who would spend an evening of entertainment and instruction with Charles Meigs. "Are you not aware that the elegance and the polish of the Christian

nations are due to the presence of the Sex in society—not in the Zenana! Do you not perceive that Music, Poetry, Painting, all the arts of elegance: Luxury, Fashion (that potent spell!), are of her, and through her, and to her? Versailles and Marli, and the Trianons, had never been built for men. The loom blends and sets forth the dyes that add richer reflections to her bloom; the wheel flies for polishing the diamond that is to flash in impotent rivalry above her eyes; sea and land are ransacked of their treasures for her; and the very air yields its egrets, and marabous, and paradise birds, that they may add piquancy to her style, and grace to her gesture. Even literature and the sciences are in a good measure due to her patronage and approbation, which is the motive power to all manly endeavor. This is true, since, but for her approving smile, and her rewarding caress, what is there should stir man from the sole, the dire, unremitted compulsion to act that he may live? With woman for his companion, he acts not only that he may live, but that he may live like a Christian and like a Gentleman.”

A sage has told us that men are more like their times than their fathers and the life of this man bears out this contention. Although Meigs was rooted deeply in sober New England it was in the romantic South that he spent his formative years. His father, Josiah Meigs of Middletown, Connecticut, was the sixth generation from Vincent Meigs of Dorsetshire who emigrated to East Guilford, Connecticut, about 1647. The Meigs family were farmers in that region and the name is today remembered in Meigs' Point, a beautiful promontory bordering the Hammonasset River as it enters Long Island Sound. His mother was Clara Benjamin of Stratford. Her brother Charles Delucena Benjamin was named after a Spanish gentleman to whom the father had become strongly attached during the Revolution, and it was from this uncle that Charles D. Meigs was named.

Josiah Meigs was educated at Yale and after his marriage in 1790 removed to St. George's in Bermuda where he practiced as a proctor in the Admiralty Courts. It was on this island on Feb. 19, 1792, that Charles Delucena Meigs was born. Four years later the family removed to New Haven where the father was elected Professor of Mathematics and Natural Philosophy in Yale College. When Charles was eight years old the father was called to the presidency of the University of Georgia and the family removed to Athens in that state. Here the boy grew up and among his boyhood experiences may be mentioned his visit among the Indians for a month as a guest of the Cherokee Nation. In 1809 Meigs graduated from the University of Georgia and shortly after was apprenticed in medicine to Dr. Thomas H. M. Fendall of Augusta. From 1812 to 1815 he took two courses in the University of Pennsylvania, taking his degree in 1817. After the first course he

states in one of his manuscript lectures that he "then went home to set up for myself and practice on that stock in trade. I was still lamentably ignorant of all save some methods. I was twenty-one years of age and assumed to be a physician!! Everybody called me Doctor; I thought so myself." In 1815 Meigs married Mary, the daughter of William Montgomery, a merchant of Philadelphia, and set up in practice in Augusta, Georgia. After a year and a half he removed to Philadelphia and although practice was slow at first he soon became intimate with the medical leaders there who recognized his ability as an independent thinker. He was one of the first editors of the *North American Medical and Surgical Journal*. In 1831 he translated and published Velpeau's *Elementary Treatise on Midwifery* which he dedicated to Thomas Chalkley James. His first independent work was entitled *The Philadelphia Practice of Midwifery*. In 1837 he was appointed by the College of Physicians with Drs. Gerhard, Houston and Ruan to act with a committee of trustees of the estate of Dr. Jonas Preston which resulted in the founding of the "Preston Retreat."

In 1841 at the time of the reorganization of the Jefferson Medical College Meigs was elected to the post of Professor of Obstetrics and the Diseases of Women and Children. Among his faculty associates were Franklin Bache, John K. Mitchell, Thomas D. Mütter, Joseph Pancoast, Robert M. Huston and Robley Dunglison. From this time Charles D. Meigs came into his own as one of the most popular and influential medical teachers of his generation. In addition to his extremely busy obstetric and medical practice he took time to publish many medical works chiefly on obstetric subjects. He also took up a serious study of German and was thus able to bring to his field the work of the most important German obstetricians. His dramatic style of lecturing made him famous as an orator and among his public addresses is a notable one on *The Augustan Age* which was published in 1841. His son wrote of him that "perhaps the most remarkable feature of his life was his wonderful activity. He was never idle. I never knew him to go to bed without a book in his hand." The same authority says that in the garret of their home was maintained a most complete workshop with carpenter's bench, lathe, furnace, etc., where the father worked in metal and wood. He also expressed his artistic abilities in painting and modeling.

Among Meigs' best known publications are *Woman, Her Diseases and Remedies*, 1847, *Obstetrics, the Science and Art*, 1849, *Treatise on Acute and Chronic Diseases of the Neck of the Uterus*, 1854 (excellently illustrated with colored lithographs from drawings by the author) and *Memoir on the Reproduction of the Opossum*, 1847. This latter monograph illustrates in a fine way the scientific mind of the author through a series of careful experiments and observations carried out with all the completeness and accuracy that true research demands.

Among other scientific achievements should be mentioned his recognition of cardiac thrombosis as a cause of sudden death in labor. In speaking of this observation Gaillard Thomas writes "It has been remarked that Meigs just escaped the honor which is now and will be hereafter given to Virchow for a great pathological discovery." In 1845 Meigs visited Europe and while in Paris presented a paper on Cyanosis before the Academy of Medicine.

It seems not unlikely that the extraordinary activity which characterized Meigs' life should have eventually worn him down. In 1856 at the age of sixty-four he suffered an attack of nervous exhaustion. He realized the cause, however, and immediately set about changing his way of living. He bought 38 acres of land in Delaware County and built a country home complete with barns, workshop and equipment for carrying on farming on a small scale. He named this place Hammonassett after the region in Connecticut where his forefathers had settled. Soon after this adventure, his health very much improved but following his course at Jefferson in 1859-60 he sent in his resignation to the faculty. In commenting on this act he wrote in his garden record, "This afternoon I delivered my last lecture at the Jefferson Medical College and shall never more appear in public as a teacher of obstetrics, though I am to go on Wednesday at 4 P.M. to deliver an address of farewell to the class. I am surprised that this finale of my public life causes in me not the slightest excitement; I am simply very glad to get out of it. I am not mad with joy but am serenely cheerful at the prospect now before me of enjoying a little of the *libre arbitre* that I never yet did know."

Meigs spent his remaining years chiefly at the farm, only occasionally seeing patients in consultation. A biographer tells us "The doctor's robe cast off, he donned that of the bibliophile." These years we may believe were essentially pleasant ones and his son has given to us this description of his library which also tells us much of the man. "He had crowded together a vast mass of knowledge, of which the disorder in his library was symbolical. This was a very paradise of confusion, and the spirit of disorder there ruled over all. Here were three bookcases, whose arrangement was like that of the night before the creation. There was an Italian Bible of the sixteenth century almost squeezed to death between two fat volumes of obstetrics; and of the complete works of Cicero there were generally two or three volumes on a piano stool for the children to sit on. The mantelpiece was in a yet more uncultivated state than the bookshelves. The centerpiece was commonly a tin canister of hunkodora tobacco, looming up from a waste of empty match boxes, two or three half-finished busts of General Grant, and some scissors for pruning the trees, all of which had a tendency to be brought together by the lumps of beeswax that were scattered about. From this disordered wilk, lying on a

cushion, which the dogs had almost torn to pieces, and with Humboldt's *Cosmos* staring him in the face, he was wont to declaim to his grandchildren upon the incalculable advantages of order, and the keen pleasure it gave him to see everything in its place."

On the twenty-second of June, 1869, at the age of 77, Charles Delucena Meigs died.

Having briefly reviewed his life, let us try to approach some understanding of Meigs' antagonistic attitude toward anesthesia in childbirth, the transmissibility of puerperal fever, and the operation of ovariectomy. We may expect that a man of his forceful nature would hold strong opinions. A search into his writings reveals the positiveness with which he stated these views. In the early days of anesthesia it is not difficult to imagine the lack of skill with which it was probably administered. Meigs' opposition to its use in obstetrics was chiefly based on its dangers and his biographer John Bell states that this opinion was common with the majority of practitioners in Philadelphia. Meigs' opposition to chloroform he states "was certainly not without reason when scarcely a week passes but we hear a death from chloroform." Meigs further opposed anesthesia on the ground that it lessened or stopped labor pains and therefore was contrary to normal physiology, an indictment which at that time was probably true in many instances.

On the subject of puerperal fever Meigs made an exhaustive study. He was particularly impressed with the value of Gordon's pioneer work. In his *History, Pathology and Treatment of Puerperal Fever* he writes, "Dr. Gordon's volume . . . has so convincing and truthful an air in every page and line that I cannot imagine anything more fitted to impress the mind of a reader with the warm and irresistible convictions of the author." Meigs' work on this subject was a republication of the essays of Alexander Gordon, William Hey, John Armstrong and Robert Lee. Both Gordon and Armstrong were convinced of the infectiousness of the malady while Hey and Lee, though not as positive in their assertions, recommended using all precautions for its prevention preferring thereby to be on the safe side. In spite of these doctrines which Meigs himself had edited, it is somewhat amazing to find him stating his opinion that "Should the student ask me how to explain the curious occurrence of cases in the practice of one medical gentleman, while his neighbor meets with no such cases, I cannot account to him for so great a mystery; one which evinces rather a strange coincidence of accidents, than a peripatetic causation by the doctor. I prefer to attribute them to accident, or Providence, of which I can form a conception, rather than to a contagion of which I cannot form any clear idea, at least as to this particular malady." And again, "if my exposition of the doctrine of this contagion . . . is in-

sufficient to bring the reader over to my way of thinking, I at least can never convince him, and must be content forever to let him alone in his fantasy." We recognize in such statements Meigs as an indomitable fighter for what he considered the truth but it is difficult from our viewpoint to see how he could have gone so far astray.

Meigs was against the employment of ovariectomy for any reason, stating that "no urgent, imminent and definite necessity can ever be supposed of an ovariectomy operation," and also, "I am opposed then to the operation of ovariectomy, and I am opposed to it on the grounds of objection I consider valid against all surgery that is not unavoidable." Meigs certainly had some ground at least for his opinion concerning this procedure and based his argument chiefly on Lee's statistics of all known operations of ovariectomy from 1809 to 1846, which reported 118 cases with 40 fatalities. We may come to the conclusion honestly, I think, that there was some justification for the attitude of Meigs toward anesthesia and ovariectomy. With regard to puerperal infection his was one of those mistakes which is nothing short of disaster. The evil which he unconsciously did lives after him so that in the light of present-day knowledge it is somewhat difficult to appraise his usefulness. However, in spite of his errors Charles Delucena Meigs stands out as a brilliant and stimulating personality, who unquestionably elevated the standards of teaching and practice of obstetrics in America. He was indeed a great leader in medicine and those who came under his influence were better men for that contact. His life in the standards of his day was an eminently successful one and we can truthfully think of his career ending, as described of old,

"in a full age,

Like as a shock of corn cometh in, in his season."

REFERENCES

- Bost. M. Surg. J. 40: 106, 334, 1849. Bost. M. Surg. J. 39: 465, 1849. *Kelly and Burrage*: American Medical Biographies, Baltimore, 1920. *Meigs, C. D.*: A Treatise on Acute and Chronic Diseases of the Neck of the Uterus, Philadelphia, 1854. *Meigs, C. D.*: Women and Their Diseases—A Series of Letters to His Class, Philadelphia, 1848. *Meigs, C. D.*: Memoir on the Reproduction of the Opossum, Philadelphia, 1847. *Meigs, C. D.*: Obstetrics, the Science and the Art, Philadelphia, 1849. *Meigs, C. D.*: The Augustan Age, Philadelphia, 1841. *Meigs, C. D.*: The History, Pathology and Treatment of Puerperal Fever, Philadelphia, 1842. *Meigs, C. D.*: Woman and Her Diseases and Remedies, Philadelphia, 1859. Transactions, College of Physicians, Philadelphia 4: n.s., 1863-74. *Williams, S. T.*: The American Spirit in Letters, London, 1926.

Society Transactions

OBSTETRICAL SOCIETY OF PHILADELPHIA

MEETING OF DECEMBER 5, 1935

The following papers were presented:

Trichomonas Vaginalis Vaginitis. Dr. Helen M. Angelucci. (For original article see page 1020.)

Further End-Results in the Treatment of Carcinoma of the Cervix. Drs. Lewis C. Scheffey and William J. Thudium. (For original article see page 946.)

The Immediate and the Remote Effect of Abdominal Cesarean Section. Dr. Thaddeus L. Montgomery. (For original article see page 968.)

Item

American Board of Obstetrics and Gynecology

The results of the 1936 examinations given applicants for certification by the American Board of Obstetrics and Gynecology are as follows:

A total of 91 applications were considered this year. Of this number, 10 were rejected or voluntarily withdrawn, and of the 81 examined, 22 were failed or conditioned, and 59 were approved for certification.

The names of the 59 successful candidates were announced at the annual dinner for diplomates of this Board and their friends held at the Hotel Kansas Citian, Kansas City, Missouri, on May 13, 1936, terminating the two-day examination period just prior to the opening of the Scientific Session of the A. M. A. annual convention.

Secretary, Dr. Paul Titus, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

Erratum

A paper entitled "Neonatal Mortality" by Dr. Cornelius T. O'Connor, of Boston, Mass., published in the May issue of the JOURNAL (p. 872), was described in a footnote as having been presented as a thesis for admission to Fellowship in the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, at the annual meeting of this organization in September, 1936. This designation was due to a clerical error which was not noted in the reading of the proof. The article in question was submitted as an original contribution and not as an admission thesis to the Association.

Department of Book Reviews

CONDUCTED BY ROBERT T. FRANK

Review of New Books

Gynecology

Matters presents in *The Cervix Uteri* a general survey of our present knowledge regarding the cervix with special reference to the development of cancer, the subject which he has dealt with in the literature. Concerning the cervix as a definite entity he lays particular stress on the early diagnosis of malignant change in light of our knowledge of pelvic physiology. He suggests that hormonal control of the cyclic changes in the human female causes the well-defined structural changes which occur in the cervix coincident with the menstrual cycle. He refers to the physiologic variants in the amount of the cervical secretions which are coincident with the alterations in the cycle. In his discussion of the pathology found in the cervix, he takes up the mechanism of lacerations and other forms of trauma related to the later development of malignant conditions. Further he reviews the various infections to which the cervix is subject, venereal, postabortal, puerperal, and brings out the relationship of the cryptogenic infections to reflections and reactions in distant areas, other than toxic absorption. There are excellent sections referring to the care of the cervix during parturition and of its examination and care at the end of the postpartum period and later on.

The menopausal changes of the cervix are discussed with reference toward an early diagnosis of the "pre-malignant" cervix. In describing the embryology and the anatomy of the cervix he brings out the nature of the lymphatic spread in malignancy. In discussing the endocrinology of the cervix he goes into detail as to the estrogenic influences and their apparent similarity under certain circumstances to carcinogenic stimuli. Here he gives the experimental technic, and results, which he has carried out on rats, injecting them with various amounts of estrogenic substances in an effort to ascertain if carcinogenesis may be caused in this manner. He regards three stimuli as tending toward the development of cancer of the cervix: first, overactivity of the anterior-pituitary gland; second, underactivity of the post-pituitary gland; and third, increased demand for carbohydrates giving rise to abundant enlarged islets of Langerhans. Dr. Matters is busying himself with an effort toward making possible the diagnosis of "pre-malignancy" of the cervix, and has used in this connection the Schiller test biopsy and the animal test for prolan. He presents an outline of clinical investigation to determine the relationship of the estrogenic hormones and carcinogenics (page 60).

The section on treatment leaves little to be desired and ranges from topical application to the Wertheim operation, with cautery, electrocoagulation, diathermy, radium, x-ray and other procedures.

¹*The Cervix Uteri, With Special Reference to the Development of Cancer.* By R. Francis Matters, Lecturer in Human Physiology and Pharmacology, University of Adelaide, etc. Illustrated, 197 pages. The Hassell Press, Adelaide, 1935.

This excellent monograph with its very thorough bibliography may be regarded as a valuable contribution.

—Philip F. Williams.

Jameson in his *Gynecological and Obstetrical Tuberculosis*² has kept three aims in view: the alterations in the pathological physiology of the female genital apparatus consequent to pulmonary tuberculosis, the various forms of female genital tuberculosis, and the survey of the problem of pregnancy in tuberculous women. The main data were obtained at Saranac Lake, some of the clinical and autopsy material through the cooperation of Professor Fraser of Montreal, and Doctors Gibb and Popoff of Rochester, New York.

In tuberculous patients, dysmenorrhea was more frequent, and premenstrual and menstrual elevations of temperature were common. In reviewing the subject of pregnancy and tuberculosis, the author gives an excellent résumé of world opinion. His own point of view is sufficiently general to allow of almost any interpretation, largely influenced, as it should be, by the type of individual case demanding decision. The only method apparently employed is the emptying of the uterus under anesthesia, although aware that roentgen ray abortion is a method that can be used.

This monograph is well written, but it places too much emphasis on the literature and the opinion of others, although the author has apparently had a large personal experience, which the reviewer for one would have preferred to have emphasized. An excellent bibliography is appended.

—R. T. Frank.

The eighth edition of Crossen's *Diseases of Women*⁴ has just appeared. In this, Robert James Crossen is co-author. The entire book has been revised and reset. It now contains 1,058 illustrations. It is 999 pages in length.

The book is sufficiently well known and has really been accepted as a classic for so long that an extended review is hardly necessary. Its contents are even more encyclopedic than before. The text has been brought up to date, great care being shown in the selection and completeness of incorporated new material.

The reviewer was particularly impressed with the care taken in the chapter on anatomy and physiology, in which the endocrine phases of sex phenomena are described in an unusually clear fashion. There are 148 pages devoted to gynecologic pathology, in which ovarian tumors are especially featured.

The illustrations of this book are unique in that every effort has been made to incorporate the best from widely distributed sources, due credit, of course, being given to the authors, in addition to many original figures of the authors, which are beautifully executed and well reproduced.

This book is so well arranged that it is of great use to the student and yet will continue to prove of value later in his activities as a general practitioner or specialist. Between this volume and *Operative Gynecology* by the same authors, an unusually full and complete survey of the entire field of gynecology can be obtained.

—R. T. Frank.

²*Gynecological and Obstetrical Tuberculosis*. By Edwin M. Jameson, M.D. Fellow of Trudeau Foundation, attending surgeon, Saranac Lake General Hospital, etc. Illustrated with 31 engravings. Pp. 256. Lea & Febiger, Philadelphia, 1935.

⁴*Diseases of Women*. By Harry Sturgeon Crossen, Professor Emeritus of Clinical Gynecology, Washington University School of Medicine, etc., and Robert James Crossen, Instructor in Clinical Gynecology and Obstetrics, Washington University School of Medicine, etc. Eighth edition, entirely revised and reset. With 1,058 engravings, 999 pages. The C. V. Mosby Co., St. Louis, 1935.

Volume I of a series entitled *Cirugia Pelviana*³ (Pelvic Surgery) is published by Rocha who is Professor of Surgery at Montevideo, Paraguay. It is a small, concisely written book covering the surgical anatomy of the pelvis, and is divided into 4 parts dealing with embryology, osseous and soft parts, fascias, and the so-called "visceral-pelvic pedicle."

The first 3 of these offer nothing new, but are adequately presented. The "visceral pelvic pedicle" is a leaf-shaped area whose vertex is situated at the umbilicus, base at the sacrum, and whose margins are formed by the umbilical arteries. It includes the structures surrounding the bladder, uterus, and rectum, comprising fascias, ligaments, vessels, nerves, and lymphatics. In the author's opinion it is of prime importance in pelvic surgery.

Modern books dealing with embryology and anatomy, especially when limited to one particular field, appear rather infrequently. For this reason alone this book is welcome. The only serious defect that should be rectified is its lack of illustrations. Many of these are actual photographs of dissected specimens which, although praiseworthy, do not allow for a clear enough presentation of the structures. For this reason, also, the text is often difficult to follow.

—Frank Spielman.

The seventh volume of Stoeckel's *Handbuch der Gynäkologie*⁵ has just come into the reviewer's hands, although dated 1932. It is of big size, containing 1,014 pages. Two topics are discussed: one, the diseases of the ovary and parovarium by Fritz Kermauner of Vienna, who has since died; and the other, tumors of the fallopian tubes by L. Nürnberger of Halle. There are 574 pages devoted to the first topic and 393 to the second.

Every disease of the ovary is discussed, including ovarian pregnancy in which the American portion of the literature is most incomplete. The main discussion on the ovary naturally deals with neoplasms of this organ. The first portion on ovarian growths includes the benign, not strictly neoplastic, enlargements. The second portion covers neoplasms or blastomas. Kermauner has not attempted any new type of classification but sticks largely to that of Pfannenstiel as well as the new classification of von Franqué. In dealing with fibroma of the ovary, no mention of the occurrence and frequency of hydrothorax is given, although this is now a well-recognized syndrome in combination with ascites. The illustrations, especially those of pseudomucin cysts of the ovary, are profuse and illuminating. Of approximately 200 cases, only 16 showed carcinomatous degeneration. Granulosa and theca cell tumors are classified strictly according to their morphology, no attempt to employ biologic methods of differentiation being made. The illustrations of dermoids include many rare conditions, although it is impossible to agree with the author in all of his interpretations, for example, such as tonsils and prostate.

Both from a clinical point of view and that of a pathologist, the treatment of ovarian tumors is satisfactory. Operative methods and treatment are likewise discussed as well as the results obtained by operation. The final chapter deals with radiotherapy and the proper method of alleviating the suffering of inoperable conditions.

Nürnberger divides neoplasms of the tube into those of the mucosa, muscularis, subserosa, serosa, and fimbriae. In his description of tumors, a statistic of primary

³*Cirugia Pelviana, (Primexo) tomo. Anatomia quirurgica, pediculovisceral-pelviano.* Por Oscar Rodríguez Rocha, profesor agregado de Cirugia, Facultad de Medicina de Montevideo. Casa A. Barreiro y Ramos, Montevideo, 1935.

⁵*Erkrankungen der Eierstöcke und Nebeneierstöcke und die Geschwulste der Eileiter.* Bearbeitet von F. Kermauner, Wien, und L. Nürnberger, Halle. Siebenter Band in Stoeckel's *Handbuch der Gynaekologie*. Mit 472 zum Teil farbigen Abbildungen im Text, 1,014 Seiten. Verlag von J. F. Bergmann in Muenchen.

tubal carcinoma takes up 125 pages in the form of tables, and covers 301 cases from 1886 to 1931. This adds unduly to the bulk of this already large volume.

This contribution will be found of great value in looking up the Germanic literature which is very completely dealt with. Much of the basic literature can be found. It contains little new material but has brought Veit's previous edition up to date. The illustrations, as in the last of these volumes, are profuse, excellent, in many cases colored.

—R. T. Frank.

Stoeckel's *Practice of Gynecology*⁶ has a fifth edition appearing one year after the preceding one. The book as heretofore is of large size with more than 750 pages and with an increasing number of exceptionally fine illustrations and colored plates.

This volume gives an unusually good survey of the subject of gynecology, clearly and concisely written and well arranged. Operations are indicated but the operative phase is not particularly stressed as the text is largely meant for students and practitioners, although it contains much information of importance to the specialist as well. In addition to the usual contents of gynecologies, the related phases of urology are carefully entered into. Gynecologic endocrinology is very clearly described. Such related subjects as diseases of the abdominal wall and rectum are also discussed. Symptom-complexes described include backache and chronic constipation; methods of treatment discussed take up radiotherapy, thermo- and heliotherapy, as well as the hygiene of menstruation. As in the previous edition, the last chapter includes the gynecologic pharmacopeia which includes innumerable preparations quite unknown on this side of the Atlantic. References to the German literature are full. Approximately 10 or 12 references to the American literature are included. The rest of the world has been almost entirely ignored.

—R. T. Frank.

Novak believes that with some knowledge of sex biology, the woman is a better patient. His book on *The Woman Asks the Doctor*⁷ is a simple exposition of the problems of womankind, with a selection of subjects which are of particular interest to them.

He discusses the difference between femaleness and maleness, the anatomy of the genital organs, with a very simple but understandable discussion of the physiology of the sex cycle, as well as those of the various endocrine glands. The periods of life, including puberty, the years of sexual maturity and the "change of life" are taken up. He also mentions the disorders of menstruation, sterility, leucorrhea, and cancer, and finally a short chapter on sex life.

This book is unpretentious, well written, without exaggerations, and should be understandable to any educated person.

—R. T. Frank

*Etudos Cirurgicos*⁸ by Ribeiro is an attractively presented book, consisting of 22 articles dealing with a wide variety of surgical subjects. Included are such topics as ovarian cysts, tumors of the appendix, heterotopic dentition, supernumerary breasts, typhoid perforation of the intestine, cancer of the gallbladder, fracture of the frontal bone, etc., to mention only a few. Most of the articles are case reports,

⁶*Lehrbuch der Gynaekologie.* Von Professor Dr. W. Stoeckel, Universitaets-Frauenklinik zu Berlin. Fuenfte, neubearbeitete Auflage, mit 465 Abbildungen im Text und auf 66 farbigen Tafeln. Verlag von S. Hirzel in Leipzig, 1935.

⁷*The Woman Asks the Doctor.* By Emil Novak, M.D., Associate in Gynecology, Johns Hopkins Medical School, etc. Illustrated by Carl Clarke. Williams & Wilkins Company, Baltimore, 1935.

⁸*Etudos Cirurgicos.* Par Eurico Branco Ribeiro. I. Serie. 241 páginas. Sociedade Editora Medica Limitada. Sao Paulo, Brazil, 1934.

and few present anything new or of startling importance. The literature as a rule is adequate, and occasionally the compilations are exhaustive. As an example, the presentation of 2 cases of supernumerary breasts, in a long article eliciting 117 references, may be mentioned.

As has been mentioned, the format of the book is attractive and the print clear. One wishes, however, that the material were of greater interest and importance.

—Frank Spielman.

Rogeat's *Morals and Prostitution*⁹ gives a survey of present conditions of prostitution in various countries. Of the United States, he says that in spite of the proclaimed Puritanism and extra-legal status, professional and amateur prostitutes are numerous, and the white slave traffic flourishes as elsewhere. Particularly in countries where prostitution is legalized, this traffic is under the same laws of supply and demand as other business activities.

The underlying thesis is that countries in which prostitution has a legal status do not show a diminishing birth rate or decadence. He favors control and regulation.

—R. T. Frank

Obstetrics

With a minimum of theory and an emphasis on the practical aspects of the subject, Dr. Beck presents his system of teaching and practice at the Long Island Medical College in this volume, *Obstetrical Practice*.¹⁰

The subject matter shows that the methods recommended in treatment have been born of personal experience, and are such as he has taught for many years to future practitioners. The text is easily read (in that respect it resembles Osler's *Practice of Medicine*), and although the text is concise in discussing theory, it does not drag in presenting practice. The illustrations, of which there are over a thousand, very suitably correlate the subject matter. In appropriate sections, as the steps of labor, the serial strips of four views of the process should be extremely helpful to a complete understanding of its progress. Many portraits of eminent figures in obstetrics are included, with a few lines of biography. At the end of each chapter is a pertinent bibliography, often with historic or epoch-making contributions included.

Beginning with the ovarian cycle, one is logically carried through the physiology of the reproductive process to the development of the fetus and the changes in the maternal organism incident to pregnancy. Diagnosis, antenatal hygiene, and prepartal examination are well described in appropriate sections. The chapters relating to labor should be of inestimable worth to the student or practitioner who is not thoroughly familiar with the mechanism of labor. The extreme importance of a fundamental knowledge of the mechanics of labor for those who engage in obstetrics is an elementary truth. And in these chapters, the physics, mechanics, clinical course, and the conduct of the process are described so simply and fluently that it should be an easy matter to grasp a full understanding of the subject from reading this portion.

As the book continues, one finds that in the clinical treatment of abnormal obstetrics or complicating conditions, Beck displays a conservative tendency, and in his discussion of operative obstetrics, he recommends well-tested procedures. The technic of his two-flap, low cervical section is given in detail and is fully illustrated.

The reviewer feels that this volume will achieve a deserved popularity due to its

⁹*Mœurs et Prostitution*. Par Marcel Rogeat. Les Grandes Enquêtes Sociales. Nouvelles Editions Latines. 7, Rue Servandoni, Paris, 1935.

¹⁰*Obstetrical Practice*. By Alfred C. Beck, Professor of Obstetrics and Gynecology, Long Island College of Medicine, etc. With more than one thousand illustrations, 702 pages. William & Wilkins Company, Baltimore, 1935.

directness in teaching, its clearly defined technic and indications for operations, the concise and easily read text with a minimum of theory, and its many well-executed and well-correlated illustrations.

—Philip F. Williams

For the general practitioner who still handles the bulk of obstetric work and with the majority of deliveries at home, Greenhill offers *Obstetrics for the General Practitioner*,¹¹ a small compact volume which discusses such important problems as may be met with frequently. There is a fine chapter on prenatal care and an equally good chapter on postpartum care at the end of the book, which stresses the necessity for long-continued observation of the recent mother. In discussing the management of labor the author is thoroughly conservative. Possibly nitrous-oxide and ethylene suggested as obstetric anesthetics will be little used by the general practitioner. He warns against the promiscuous use of pituitrin and feels that properly conducted instrumental delivery is far safer for the baby than a prolonged second stage. The statement that more women die from accidents during the third stage of labor than in the other two stages combined is sufficient reason for the emphasis he has placed on the conduct of this part of labor.

His recommendations for the treatment of septic incomplete abortion should do much toward terminating promiscuous curettage in that condition. It might seem that an unnecessary amount of space, eight pages, was devoted to theory and pathology of ectopic pregnancy. Greenhill recommends conservative treatment of toxemia in the very well-written chapter on that subject. He is thoroughly explanatory in the necessitated treatment of placenta previa in the home. The subject of complications of pregnancy is well handled. In discussing operative delivery, Greenhill calls attention to the wide indications, not usually recognized, for the low cervical section, and introduces sufficient illustrations for the advantage of the occasional operator. He also shows a more frequent need under certain conditions for the Porro operations. It is to be doubted whether in a book of this type, fourteen pages should be devoted to local, infiltration anesthesia in obstetrics. There is an excellent discussion of the dystrophia dystocia group with the recommendation that cesarean section should be more frequently used. One looks in vain for a discussion of inertia uteri nor does one find what might be helpful to the general practitioner, namely, the points which Greenhill has found helpful in the minor complaints and complications of pregnancy. The maternity service of a general practitioner should be greatly benefited by a study of this splendid presentation.

—Philip F. Williams

Dr. Thoms' long-continued investigations regarding the *Obstetric Pelvis*,¹² especially as to roentgenometry, find their summation in this splendid little volume. He presents in thorough detail the method of roentgenometry which his writings have popularized. The broad applications of these findings are shown, for instance, in the relation of the dolichopellic pelvis to posterior positions of the occiput. From clinical application of roentgenometry, he is firm in the conviction that this should form a part of the prenatal examination of every primiparous woman. There is an excellent discussion of the anatomy of the pelvis, its physics, and sexual differences in the male and female. He describes clinical pelvimetry and roentgen-pelvimetry with particular reference to superposed Grid method, and points out marked varia-

¹¹*Obstetrics for the General Practitioner.* By J. P. Greenhill, Professor of Gynecology, Loyola University School of Medicine, Chicago. Edited by Morris Fishbein, M.D. 304 pages. National Medical Book Company, Inc., New York, 1935.

¹²*The Obstetric Pelvis.* By Herbert Thoms, Associate Professor of Obstetrics and Gynecology, School of Medicine, Yale University. With drawings and photographs by the author, 128 pages. Williams & Wilkins Company, Baltimore, 1935.

tions found between the measurements as determined by these two methods. He lists the advantages to be gained by adding the lateral view of the pelvis.

There is a very fine interpretation of the work of Caldwell and Moloy whose anthropoid pelvis is similar to the dolichopellic pelvis previously described by Thoms. Interesting to note is his statement "the adult female pelvis of Nature is preferably round and not oval," which will upset the ideas previously maintained on this subject. Thoms discusses the common and rare types of pelvic abnormalities, especially in their relation to labor. He concludes the book with a chapter on the diagnosis of disproportion, and discusses the various clinical procedures. He suggests that all doubtful cases of disproportion necessitate roentgenologic study. The last chapter relates to fetal-cephalometry in utero. The bibliography shows a thorough study of the literature, and the illustrations in the book are well chosen.

—Philip F. Williams

Stroganoff, whose name is internationally synonymous with the conservative treatment of the convulsive intoxication of pregnancy, gives in *Traitement de L'Eclampsie*¹³ a complete statement of his method. There is a considerable amount of statistical evidence presented to condemn effectively the early radical operative treatment of eclampsia.

In recapitulating the various theories as to the etiology of eclampsia, Stroganoff feels that the work of D'Anselmino and Hoffmann has done much to stimulate new lines of attack on the question of cause. He regards "la théorie nerveuse" as being, in part, supported by the success of his own method which has for its first aim the quieting of the irritated cerebral centers.

The rationale of the various steps in the treatment and the technic itself are fully considered. The combined services of twelve hospitals in Leningrad using the technic in all its details treated 1,113 cases of eclampsia, with 41 deaths, 3.7 per cent mortality. This Stroganoff regards as an almost irreducible minimum.

While he would prefer to have his method used exactly as prescribed, he admits such variations or additions as the use of barbiturates or magnesium sulphate may supplant chloral hydrate or chloroform. Where this therapy fails, rupture of the membranes or obstetric delivery by the vaginal route is advised where feasible. None of the patients in the collective study at Leningrad were delivered by cesarean section. The final chapter is devoted to a description of the dosages and administration of the drugs. There are many American references in the bibliography. And it is noteworthy that no mention is made of the lowering of the incidence of convulsive toxemia through efficient antenatal hygiene.

—Philip F. Williams

Vignes' new contribution to obstetric literature, *Maladies des femmes enceintes*,¹⁴ represents the logical and, one might say, long-expected sequel to his earlier volume, *Physiologie obstétricale*, published in 1923. Once again Vignes proves his thorough familiarity with a large literature dealing with the merely accidental or causative relations of disease to pregnancy. Almost every instance of the coexistence of pregnancy and disease imposes on the obstetrician, as well as on the medical specialist, the responsible and often difficult task of determining appropriate management of disease and pregnancy for the best interest of both mother and fetus. A great deal of helpful information becomes readily available in these two volumes.

¹³*Traitement de L'Eclampsie*. Par B. Stroganoff, Leningrad. Préface de H. Vignes. 112 pages. Masson et Cie, Paris, 1935.

¹⁴*Maladies des Femmes Enceintes*. Par Henry Vignes. Vol. I. Affections du tube digestif; Vol. II. Affections du foie, du pancréas, maladies de la nutrition, parois abdominales, péritoine. Masson et Cie, éditeurs, Paris, 1935.

The first of them deals, in the truest sense of the word, with the entire length of the digestive tract, beginning in Chapter I with diseases of the mouth and ending in Chapter XX with hemorrhoids. This topographic sequence guarantees consideration of every possible derangement of every part of the tract but, on the other hand, leads to certain inconsistencies and even some confusion. Taking the acute infectious diseases as an example, representing always merely accidental complications, we know that, in general, they all show a definite similarity in their effect on mother and fetus. They could advantageously be discussed as one group. Under the employed scheme, however, diphtheria is considered as a disease of the pharynx in Chapter III, while typhoid and cholera, together with parasites, appear in Chapter XV. A very competent discussion of hyperemesis, covering more than 100 pages, finds its place in the chapter on diseases of the stomach.

The second volume (others will follow) deals with diseases of liver and pancreas, and anomalies of nutrition, abdominal wall and peritoneum. Adherence to the same scheme of passing in the discussion from one organ to the next, in this volume also precludes a broader grasp on the effects of certain general types of diseases upon pregnancy and vice versa. However, although the reviewer emphasizes some of the shortcomings of this topographic arrangement, he is fully aware that grouping of diseases in the manner customary in textbooks of medicine does not prove entirely suitable for the discussion of the complex interrelations between pregnancy and somatic anomalies of all kinds, since some of the latter are not strictly classifiable as diseases.

A decidedly more pertinent criticism can be offered by the obstetrician in regard to these volumes. Contraception, sterilization, and therapeutic abortion undeniably play a significant rôle in the protection of women suffering from certain diseases against risks likely to arise or definitely to be expected by an intercurrent pregnancy. No mention can be found in these volumes of such protective measures.

—Hugo Ehrenfest

In recent years in spite of the difference in language, much greater attention has been given to the publications appearing in the South American journals. This is due to the importance of these communications. The volume representing the proceedings of the *Second Argentinian Congress of Obstetrics and Gynecology*¹⁵ held at Buenos Aires in 1934 is of great interest. It comprises all the papers presented at this meeting, published in extenso, and covers almost 1,000 pages.

The material represents an excellent cross-section of the field. Lascano, Sayado, Raimondi, Costa, Mönckeberg, and many others discuss tuberculosis in pregnancy. It is interesting to note that the trend is toward a more conservative attitude in regard to indications for the interruption of pregnancy than is generally practiced in this country. However, the arguments are rational and often incontrovertible.

That there is great interest in the endocrine field is shown by numerous papers dealing in one way or another with this subject, especially by Ahumada's exhaustive monograph, as well as articles by Puento, Masciottra, Martinez de Hoz, di Paola, and others. As is so general, optimism perhaps carried beyond absolute justification in regard to the use of hormonal preparations is the keynote. This criticism, however, may be applied to all countries.

One subject chosen, conservative surgery in gynecology and its results, elicits opinions which this reviewer regards as being the most enlightened in the specialty. Stajano, Nicholson, Althabe, Ortiz, Galindez, and others advocate conservatism in

¹⁵*Segundo Congreso Argentino de Obstetricia y Ginecología*. Buenos Aires, 1934. Relatos y discusiones publicados bajo la dirección del secretario general Dr. Alfredo J. Guiray. Con 135 figuras, 4 en colores, 2 gráficos. En la secretaria general del congreso, Buenos Aires.

the management of uterine myomas, adnexal infections, as well as affections of the ovaries, especially ovarian cysts. The results of conservatism qualify the arguments presented most satisfactorily. Conservative operations on the uterus are also described.

From the evidence presented in this book the Congress must have been well worth attending. Reports of succeeding Congresses should be awaited eagerly.

—Frank Spielman

In this statistical and analytical review by Peller, *Der Geburtstod*¹⁶ (Mutter and Kind), one finds a comprehensive study, with wide viewpoints, of the factors concerned in maternal and infant mortality. The subject is dealt with in a broadly comparative manner, often with reference as to national policies as in the reversal of the birth rate in fascist Italy, or to the state-wide attention to infant welfare in the Netherlands.

Infant mortality is discussed under intrauterine, parturitional and neonatal deaths. The causes are not dealt with specifically but in a general sense as to the part which physician, mother, and state may play in their prevention. As to maternal mortality, Peller does not minimize the large part occasioned by criminal abortions. This he feels can only be lessened by world-wide improvement in economic-social standards, a genuine moral uplift, and by the knowledge and practice of birth control methods. He indicates a leaning toward a lessening of the restraint on abortion for social reasons, and finally, advocates more specialized education in obstetrics.

The monograph is replete with statistics regarding the mortality of women and infants in various countries, and cities and rural areas. This is an important analytical contribution on the subject, and should interest not only pediatricians and obstetricians but those concerned in the broader aspects of population reproduction and replacement.

—Philip F. Williams

In this monograph, *Physiologie und Pathologie der Wehen*,¹⁷ Antoine reviews the earlier views on the forces of delivery and the later understanding of the true nature of the uterine contractions. He describes the earlier attempts and methods to measure the strength of the uterine contractions during labor by both intrauterine and extrauterine appliances. Using the tokometer, which Crodil first demonstrated at Bonn in 1927, he has made an intensive study of uterine contractions. He demonstrates by kymographic curve the contractile ability of the uterus in the early months of pregnancy, the duration and amplitude of the contractions, as well as the uterine muscle tone, in labor, and the diminishing response to stimuli in the puerperium.

He has also studied the effect and duration of action of certain pituitary gland derivatives and ergot preparations upon the parturient uterus. By the method described, it may be possible to test uterine stimulants upon the pregnant uterus without danger. A bibliography is appended.

The simple method of study suggested here may well interest those wishing to study the physiology of the uterus when various drugs, the newer ergot derivatives or analgesic amnesic agents, are exhibited during the time of delivery.

—Philip F. Williams

¹⁶*Der Geburtstod (Mutter und Kind)*. Von Dr. Sigismund Peller. Verlag von Franz Deuticks, Leipzig und Wien, 1936.

¹⁷*Physiologie und Pathologie der Wehen*. Von Dr. Tassilo Antoine, Assistent der Universitäts Frauenklinik. Professor Weibel in Wien. Mit 43 Kurven. Verlag von Wilhelm Maudrich, Wien, 1935.

The "Eliseo Cantón" gynecologic and obstetric clinic of the University of Buenos Aires publishes a small book, *Trabajos Científicos*,¹⁹ comprising about 200 pages representing a review of the scientific papers emanating from it during the years 1931 to 1934 inclusive. Approximately 110 articles are abstracted briefly, and the journals in which they are published mentioned. Taken together, the articles show evidence of considerable activity and effort. Not only are purely medical subjects treated, but also social, eugenic, and educational problems as well, especially as they apply to obstetrics. Beruti, the director of the clinic, is to be congratulated upon the work done, and for his efforts in behalf of the community at large. The only fault to be found, perhaps, is that the papers published deal with obstetric rather than gynecologic problems. This will undoubtedly be remedied in future reports.

—Frank Spielman

Five years have passed since the last edition of Stoeckel's *Lehrbuch der Geburtshilfe*.²⁰ During that time two of the contributors to the previous edition, Hoehne and Walther, have died. Those portions of the book which they had written have been presented in this fourth edition by v. Milulicz-Radecki, Ottow, Philipp, and by Stoeckel, who has rewritten the section on anatomy of the birth canal and pelvis. To Philipp, whose interest in bacteriology is well known, has been assigned the pathologic puerperium, a subject which he has handled in a splendid manner.

It is noted that the section on the menstrual cycle and physiology of the pelvic organs has been almost entirely rewritten, and includes a very large series of references of the constant changing of literature of the past five years on these subjects. Gortler's architecture of the uterine wall, a recent morphologic contribution, is discussed. Zangemeister's graphs of the intrauterine development of the child as to length and weight are included. Philipp has an excellent discussion of antiseptics and asepsis in obstetrics in the chapter on prophylaxis, as well as later in the section on puerperal sepsis. Continuing, one finds a very full discussion of mooted questions, and the theory and statistics of the obstetrics are comprehensively treated. It is interesting to note that the birth rate in Germany has dropped from forty to seventeen per thousand, that in Berlin the birth rate has fallen to ten, making it lower than the birth rate of Paris. A social economic note is struck in the presentation of figures representing the monetary maternity benefits which are granted by the State. A case of pregnancy and labor in a six-and-a-half-year-old girl is described. Postpartum gymnastics found of value in the University of Berlin Maternity are illustrated. There is an illustration of the "Infantibus" nipple shield, an almost perfect model, which cannot be procured on the American market today.

Ottow gives a thorough description and discussion of the pharmacology and the therapeutics of oxytocics, included in the recent ergot derivatives. The subject of dystocia and the pathologic biology of pregnancy are specially developed. Stoeckel has written a chapter on obstetric operations which leaves little to be desired in discussion or treatment, and it is beautifully illustrated. Following a short history of obstetrics is a brief chronology in which the last item places among the outstanding discoveries or advances in obstetrics, the German plan of eliminating hereditary diseases by sterilization of individuals so afflicted.

¹⁹*Trabajos Científicos 1931-1934*. Clínica Obstétrica y Ginecológica "Eliseo Cantón" de la Universidad de Buenos Aires. Síntesis. (Director: Prof. Dr. Josué A. Beruti.) 220 pages. Imprenta Frascoli y Bindi, Buenos Aires, 1935.

²⁰*Lehrbuch der Geburtshilfe*. Herausgegeben von Professor Dr. W. Stoeckel, Geh. Medizinalrat, Direktor der Universitäts-Frauenklinik in Berlin. Vierte, verbesserte Auflage, mit 620 zum grössten Teil farbigen Abbildungen im Text, 1,036 seiten. Verlag von Gustav Fischer, Jena, 1935.

This volume, representing as it does contributions from most of the university chairs in Germany, may be considered as presenting today's thoughts and practice of obstetrics in that country. The unusual development of the theory and science and the large amount of statistical data given make the book an excellent reference volume, while the discussion and treatment of operations complete its usefulness for the specialist in obstetrics.

—Philip F. Williams

Puerperal Gynecology,¹⁸ the title of this book by Bubis, is considered by him an important phase of maternity care including the repair of old as well as new lacerations. If such treatment of gynecologic lesions and complications of obstetric practice is to become common, and to be regarded as within the scope of modern obstetrics, then the training of the obstetrician must include gynecology and surgery, and it is to be doubted whether such practice will under present circumstances become widespread. The experience of the author and his success enables him to refute the objections which have been raised to the procedures which he suggests. Primarily, he advises that a parturient should be given the same consideration as a major surgical case whether or not gynoplastic procedures are to follow delivery.

Not only is the economic feature of this practice important, but it also ranks in many instances as preventive medicine, and so far as cancer prevention is concerned is prophylaxis of the highest degree. Dr. Bubis has expanded some of his previous technical communications on this subject and has included such other phases of obstetrics, as anatomy, physiology, prenatal care, and the pathology of the cervix, and toward the end of the book, chapters relating to puerperal care, especially therapy and procedures, postnatal care, puerperal morbidity and mortality and end-results, and the economic phase of puerperal gynecologic operations. Attention should be called to the excellent chapter on postnatal care, a phase of maternity care which is often neglected.

The puerperal gynecologic operations on the cervix are modified from the usual gynecologic procedures to meet the condition presented. The author states that every laceration susceptible of suture should be repaired. One is possibly surprised at the extent of the plastic operations on the anterior and posterior wall which he practices. Operations necessary for lesions of the anus which may be corrected by operation at the time of delivery are described.

To avoid infection rectal examination throughout labor is indicated and for further safety should be made with the patient in the Sims position. Of the many puerperal gynecologic operations which were done, only 55 per cent were preceded by spontaneous deliveries. The high operative incidence he ascribes to the wide use of sedation and anesthesia during labor and delivery, and it is noted that he prefers inhalation anesthesia to local for his immediate operations. Indications for immediate operation and those reasons which cause him to delay his repairs for from one to several days are given, as well as the contraindications which would add to delivery the extra burden of operative manipulation.

In nearly 1,200 cases gynoplastic operations were performed for old lacerations; 221 complications were attributed to such repairs, of whom three women died. In 138 cases there were complications not attributed to the repairs. The febrile morbidity was extremely low. Consideration of his end-result tables indicates that a result regarded as excellent, on postnatal study, was achieved in three-fourths of the ward cases.

¹⁸*Puerperal Gynecology*. By J. L. Bubis, M.D., F.A.C.S., consultant in obstetrics, gynecologist, Mt. Sinai Hospital, Cleveland, Ohio, etc. Illustrated, 199 pages. William Wood & Co., Baltimore, 1935.

Whether or not one agrees fully with the arguments advanced and the practice suggested, it must be freely acknowledged that the book contains a thorough description of a technic, well illustrated, for those obstetricians who feel surgically capable of and desirous of taking up this type of work.

—Philip F. Williams

The new edition of *Midwifery*²¹ by "Ten Teachers" appears under the direction of Dr. Clifford White who supersedes Sir Comyns Berkeley as editor. This book, prepared primarily for the use of students, has expanded to an extent that should make it highly useful to anyone practicing obstetrics. It is stated that, although the book is a product of collective authorship, the entire manuscript has been read, criticized, and changed by each of the contributors, so that as a matter of fact the book represents a modified viewpoint of all ten contributors.

This edition bears witness that much of the obstetric literature in recent years has been reviewed and many advances will be found to have been incorporated in the text: especially is this true regarding the sections on physiology, menstruation, and the ovarian cycle. There is new material, also, in the sections on toxemia of pregnancy, puerperal infection, and pyelitis. In the last there is presented a discussion of the influence of the ketogenic diet on urinary infections. The conservative therapy of toxemia of pregnancy is recommended, and a conservative viewpoint is held regarding operative interference in labor unless for definite indications. The figures shown in the text clearly demonstrate that the greater the degree of obstetric manipulations in toxemic women the higher the mortality rate will rise. There is little mention of the use of x-ray in connection with the diagnosis of contracted pelvis or cephalopelvic disproportion.

A page is devoted to answering the question regarding sterilization at the time of cesarean section. The author of this section feels that, except for a most definite indication such as a grave organic disease in the mother, the woman should not be sterilized. He states: "It is the parents' business to avoid future pregnancy, not the practitioners' to make it impossible." However, he does not suggest any methods of contraception for the woman who, after cesarean section, does not wish to become pregnant again.

In the excellent section for the relief of pain in obstetric practice, chloroform is mentioned as the anesthetic still usually employed in England, but its disadvantages are very definitely given. The lateral position of the woman in labor formerly commonly used in England is illustrated only in the section discussing manual rotation of occipitoposterior. The subject of transfusion is well presented. In the discussion of low cervical section, no preliminary separation of the peritoneal flaps, a definite step in the technic advocated in this country, is referred to, and a transverse incision of the uterus is recommended.

This volume may be regarded as a very good textbook on obstetrics and from the method of authorship it may be considered typifying rather accurately the obstetric teaching of the medical schools in London.

—Philip F. Williams

In this *Practical Handbook of Midwifery and Gynaecology*,²² Haultain and Kennedy have compressed the highpoints of the two associated branches of medicine. It has been necessary in order to save space to present the material very concisely

²¹*Midwifery*. By Ten Teachers. Under the direction of Clifford White, M.D., F.R.C.P. (Lond.), F.R.C.S. (Eng.), etc. Edited by Sir Comyns Berkeley, J. S. Fairbairn and Clifford White. Fifth edition, illustrated, 740 pages. William Wood & Co., 1935.

²²*Practical Handbook of Midwifery and Gynaecology*. By W. F. T. Haultain, Gynaecologist, and Clifford Kennedy, assistant gynaecologist, Royal Infirmary, Edinburgh, etc. Second edition, with 356 pages. William Wood & Company, Baltimore, 1935.

and one finds etiologic factors, symptoms, signs, and treatments listed in groups, tersely phrased. This style of presentation renders the book particularly suitable for the student. There is an excellent description of the pelvic cellular tissue correlating anatomy and the spread of pelvic infection. One is surprised at the recommendations to permit postpartum patients to be allowed up from the fourth day on. The mixed vaccine treatment of puerperal sepsis has been found a most satisfactory method in the hands of the authors. The handling of gynecology is brief, concise, and as in the obstetric section, often by tabular form. The few illustrations of operative technic do little more than suggest the principles involved. The Stockholm method of radiation is the choice of treatment in carcinoma of the cervix. Many advances in obstetrics and gynecology which have occurred during the nine years since the first edition appear to be incorporated in this book.

—Philip F. Williams

History of Medicine

Thoms has written a charming historical monograph on *Classical Contributions to Obstetrics and Gynecology*²³ dedicated to the memory of J. Whitridge Williams, with a foreword by Howard A. Kelly.

The author has selected with excellent judgment, striking personalities to illustrate each phase of obstetric and gynecologic history that he desires to emphasize. Sufficient characteristic extracts from the writings of these famous figures are present to give the reader an excellent conception of his place in medical history. No living person has been considered, and no one whose activities extended beyond 1900.

To illustrate, the chapter on general obstetrics begins in the second century with Soranus. He then skips to William Harvey, and in this period likewise mentions Hendrik van Deventer, William Hunter, as well as Lejumeau de Kergaredec. Thus he covers the early period, the introduction of ergot, and the discovery of the fetal heart. He then takes up James Young Simpson, John Braxton Hick, Hegar, and Pinard, who died at the age of ninety in 1934.

The succeeding chapters deal with the course of labor, the pathology of pregnancy, operations of obstetrics, puerperal infection, deformities of the pelvis, and concludes with gynecology.

Not only is the bookmaking faultless and graced by numerous interesting and rare illustrations but the style of the author is attractive and readable. This work will be enjoyed by every gynecologist and obstetrician.

—R. T. Frank

Riesman has written a fascinating book on *The Story of Medicine in the Middle Ages*.²⁴ According to the author the Middle Ages should not be called the "Dark Ages." Even though superstitions, barbarous and cruel customs were prevalent, humanity was not stupid.

With one church, one language (Latin), one social society, every cultured person could make himself understood in any country, and interchange of opinion was common. Medicine at this time was not sharply separated from philosophy and theology. It is impossible in a review to do justice to the enormous amount of material incorporated in this comparatively small volume. The author covers the Greek

²³*Classical Contributions to Obstetrics and Gynecology*. By Herbert Thoms, M.D., Associate Professor of Obstetrics and Gynecology, Yale University. With a Foreword by Howard A. Kelly, M.D., Professor Emeritus of Gynecology, The Johns Hopkins University. 265 pages. Charles C. Thomas, Springfield, Ill., 1935.

²⁴*The Story of Medicine in the Middle Ages*. By David Riesman, M.D., Sc.D., Professor of History of Medicine and Professor Emeritus of Clinical Medicine, University of Pennsylvania, etc. Illustrated, 402 pages. Paul P. Hoeber, Inc., New York, 1935.

inheritance, monastic medicine which was in its height in the tenth century, and which proved to be merely an avocation with the monks until the Council of Rheims forbade the monks to take part in practice in the year 1219.

The School of Salerno was under lay control. Considerable knowledge of Greek and Arabian medicine existed. Their most famous surgeon was Roger of Parma.

Arabian medicine preserved some of the Greek medical knowledge and added valuable contributions of its own. Really it was the Persian, Syrian, Saracen, and Jewish physicians who practiced in the Arabian countries. The most famous of this group was Maimonides.

Jewish physicians brought Arabic and Greco Arabic writings to the Occident. During the scholastic period, bedside medicine was neglected and was displaced by hair-splitting discussions. Consequently, Roger Bacon, who favored experimentalism, was in bad odor and spent twenty-four years in prison. In this period, Petrus Hispanus, a physician, later became Pope John XXI. The author likewise describes the schools of alchemy and of astrology.

The universities were a growth of the twelfth and thirteenth centuries. Most famous were Montpellier, Bologna, Padua, and Paris. The clerics were gradually replaced by lay teachers. There was an age limit for the students. No surgery was taught. Oxford and Cambridge developed, based on the Paris model.

Dissection of the human cadaver became general only in the fifteenth century. The Italians were the most assiduous and best anatomists, among them Vesalius and Fallopius. In Italy the painters and sculptors took a deep and sometimes a human interest in anatomy. Based on dissection, the work of Leonardo da Vinci was outstanding. The surgeons were distinct from the physicians. The French school was prominent, including Henri de Mondeville and Guy de Chauliac.

Some of the most fascinating chapters of the book are devoted to the diseases and epidemics of the Middle Ages. Leprosy, the English sweating sickness, St. Anthony's fire, in which sloughing of the extremities was the most striking symptom, the King's evil (scrofula), epilepsy, the dancing mania, and flagellants were characteristic of this age. In addition, epidemics of plague and rapid spreading of syphilis were notable.

The book is written in a scholarly but live and delightful manner. It is illustrated with many rare figures. No one interested in the history of medicine should fail to own this volume.

—R. T. Frank

Dr. Slemons, in a presidential address before the Pacific Coast Society of Obstetrics and Gynecology, read an address on *John Whitridge Williams*.²⁵ This has been put in book form and makes a small but interesting volume of particular value to the many friends of this prominent obstetrician.

Williams came from a family of physicians dating back for many generations. He was fortunate enough to begin his medical activities at the time that research had its real beginning in the United States. From the start he showed interest in pathologic investigation, a subject on which he wrote many fundamental contributions. Moreover, his conservative attitude toward cesarean section, his study of the funnel-shaped pelvis, etc., were crowned by his classical textbook on obstetrics which has seen so many editions in the course of years.

In addition to a sympathetic description of the many medical activities of Dr. Williams, the author emphasizes his genial treatment of his staff, his other activities

²⁵John Whitridge Williams. By J. Morris Slemons. The Johns Hopkins Press, Baltimore, 1935.

such as that of health commissioner of Baltimore and dean of the Johns Hopkins Medical School. Although at Johns Hopkins, the Departments of Gynecology and Obstetrics are under separate heads, Williams throughout his activity, believed firmly that these departments should be united.

This is a very sympathetic and readable biography of this famous figure.

—R. T. Frank

Miscellaneous

In 1930 Dr. Magnus Hirschfeld, the well-known "sexologist," came to New York at the invitation of the New York Deutsche Medizinische Gesellschaft, and from then on wandered across the United States. In response to further invitations, he traversed the Orient, including the Near East. He has incorporated the Asiatic and African portion of his travels in a delightful book, *Men and Women, the World Journey of a Sexologist*.²⁶

In this travelogue he includes not only all that he has seen as a tourist, but also that which his reputation and special interests enabled him to see from the point of view of a sexologist.

"The struggle between the sexes is far from being at an end." The point of view differs in every country that you traverse. The multiplicity of contrary views shows on what uncertain ground the stoney forest of legal status has been reared—cross a border and what on the near side one would be prosecuted and punished for, on the other side may be done with impunity. In Asia twins are regarded as freaks and monstrosities.

It is impossible in this review to do full justice to the charming and informative style of presentation which is evident, probably because of the excellent translation by O. P. Green, or to give even a faint idea of the innumerable incidents of interest to every reader. There is a fund of information on sex topics gleaned in Japan, the Philippines, the Dutch Islands, Bali, China and Egypt. Whether one agrees with the interpretations of Hirschfeld or not does not detract from the value and fascination exercised upon the reader.

—R. T. Frank

Guggisberg has published a monograph on the *Importance of Vitamins to the Female*.²⁷ This represents a bringing up to date of his previous contribution of the same title which appeared in Volume VIII, Part 3 of Halban-Seitz, *Biology and Physiology of the Female*, in 1929. The text in the main follows what was found in Halban-Seitz with the addition of the large increase in our knowledge which has been acquired in the last six years. It is one of the few books in which vitamins, as applied particularly to gynecology and obstetrics, can be studied without having constant recourse to the scattered literature.

The author emphasizes the innumerable contradictions which any attempts to study the literature evidence. It is almost impossible to judge the effect of vitamins and their importance by clinical study. The conditions in the human being are so much more complicated than in the fully controlled laboratory animal that deductions are misleading. Pathologic observations on the human being, likewise, give no conclusive evidence. In general, it may be said that the one group of clinicians greatly overrates the importance of vitamins, while the other is inclined to take an entirely agnostic stand. Time alone will enable us to steer a middle course. Even in the most easily evaluated disease, namely beriberi, an increasing number of ob-

²⁶*Men and Women, The World Journey of a Sexologist.* By Magnus Hirschfeld. English version, illustrated, 325 pages. G. P. Putnam's Sons, New York, 1935.

²⁷*Die Bedeutung der Vitamine fuer das Weib.* Von Professor Dr. Hans Guggisberg, in Bern. Mit 19 Abbildungen im Text und 4 farbigen Tafeln. Urban und Schwarzenberg, Wien, 1935.

servers are inclined to ascribe the disease to not only deficiency in vitamin B₁ but to other factors as yet unknown. Even factor A, absence of which is supposed to produce keratomalacia, can be imitated by other conditions, as for instance, deficient carbohydrate nutrition in children with excessive sodium chloride additions.

It is quite possible that even when all of the necessary factors are taken in the food, as is usual in adults on a mixed diet, mistakes in preparation of the meal may produce avitaminosis. In the human being, it is practically always a long-continued diminution of the vitamin rather than its entire absence which produces the trouble.

To avoid vitamin deficiency, an increased use of milk products and butter, as well as vegetables and a definite amount of uncooked organic material, must be ingested. Especially valuable are salads and fruits.

The author concludes that our entire knowledge of vitamins is still incomplete even if some of the vitamins are available in completely purified form.

—R. T. Frank

Harnes's *Clinical Management of Syphilis*³⁰ is a short, clear, well-planned and well-written monograph which takes up every phase and every stage of syphilis. It fully outlines and gives details of the treatment of every stage. The preparation of the solutions to be used are so well outlined that even those unfamiliar with the technic should readily be able to follow the directions. Not only are the primary, secondary, and tertiary stages of the disease dealt with, but also special chapters on visceral manifestations, on the treatment of pregnant women, and on congenital syphilis are given. The importance of serology, especially of the spinal fluid, is emphasized. All in all, this is a very satisfactory outline for the general practitioner, who in so many instances must treat this disease in its acute and chronic stages.

—R. T. Frank

Singer has produced a combined text and atlas in which he brings together the *Fasciae of the Human Body*.²⁸ The illustrations are excellently done and readily understood. This applies particularly to the head and extremities.

It is a pity that the author has confined both his text and illustrations entirely to the male as he would have had an excellent opportunity to clarify the pelvic fasciae in the female as well, particularly as this phase of anatomy has been largely neglected in the United States.

—R. T. Frank

The *A B C of the Endocrines*²⁷ by Jennie Gregory, at first glance, appears an amusing picture book, but when more carefully studied, it is surprising how much information is contained in the full-page graphic charts which, with their legends, form the entire text. Whether, as the author hopes, the average lay reader can gather as much from these charts as can the physician, I am unwilling to affirm. Even if this, the main aim of the book, should not be reached, every teacher of medical students will find much information and methods of illustrating the complicated endocrine situation for his classes. The ingenuity, artistry and intelligibility of this new venture are admirable.

—R. T. Frank

³⁰*Clinical Management of Syphilis*. By Alvin Russell Harnes, M.D., Chief of Congenital Luetic Clinic, New York Hospital. The Macmillan Company, New York, 1935.

²⁸*Fasciae of the Human Body, and Their Relations to the Organs They Envelop*. By Edward Singer, M.D. Department of Anatomy, College of Physicians and Surgeons, Columbia University. With 24 original illustrations, 105 pages. The Williams & Wilkins Company, Baltimore, 1935.

²⁷*A B C of the Endocrines*. By Jennie Gregory, M.S. Foreword by Carl G. Hartman. Illustrated, with 126 pages. The Williams & Wilkins Company, Baltimore, 1935.

Peterson, in *The Patient and the Weather*,³¹ has given a new, interesting, but rather bewildering description on how the patient is affected by the weather. The author claims that today we focus too much on the end process of the disease, that our pathology is that of the dead house, that we teach medicine as a science of death; in other words, that we should preferably study the patient more as an individual with particular regard to his constitution.

"The thesis concerns the effect of the environment on the patient, but chiefly the immediate environment, namely, the weather and the season."

In Volume I, Part 1, just received, the meteorologic influences on the normal person and the patient are taken up with an interesting review of Hippocrates and his medicine. The author ascribes importance of the season on such diverse conditions as conception, defective teeth, insanity and feeble-mindedness, as well as suicide. The effect of season, climate, etc., on thyroid trouble, diabetes, heart disease, eclampsia, asthma, hay fever, tuberculosis, and poliomyelitis is stressed. And finally, the effect upon the American as contrasted to the European, due to climatic environment, concludes this portion of the volume which contains innumerable maps showing the distribution according to states and climate of the various factors dealt with.

—R. T. Frank

Among the textbooks of medicine, Osler's *Principles and Practice of Medicine*,³² since its first appearance in 1892, has been one of the best known and most widely used. To a large extent the continuation of this popularity is due to the persistent effort of reflecting in every new edition all the progress in information accrued in the meantime. Since Osler's death many of the editions have been supervised most competently by his former collaborator, Thomas McCrae. We trust that his recent untimely death will not cause a noteworthy loss to future editions of this valuable textbook. It therefore proves particularly satisfactory that this last edition has not only been rewritten in several parts, has received many additions dealing with newer discoveries, but also has been completely reset so that much new material is offered within the space of a volume not noticeably increased in size.

—Hugo Ehrenfest

Rosenau's *Preventive Medicine and Hygiene*³³ has long been a generally recognized standard text in its field. With recent stressing of the economic social and the psychologic factors as important forces, preventive medicine and hygiene has become a problem less closely bound up than formerly with the questions of contagious diseases, sewage disposal, water supply, etc. This new volume clearly mirrors these profound changes in the problems of modern preventive medicine. It impresses one with the fact that recent progress in the field of medicine is chiefly along lines of wider appreciation of heretofore neglected or hardly appreciated etiologic factors in the origin of disease. Thus it seems only natural that contraception and maternal mortality appear as newly added subjects. The sections on venereal diseases, sex

³¹*The Patient and the Weather.* By William F. Peterson, M.D. Vol. I. Part 1. *The Footprints of Asclepius.* 127 pages. Edwards Brothers, Inc., Ann Arbor, Michigan, 1935.

³²*Principles and Practice of Medicine, Designed for the Use of Practitioners and Students of Medicine.* Originally written by the late Sir William Osler. Twelfth edition, revised by Thomas McCrae, Professor of Medicine, Jefferson Medical College, Philadelphia. Pages 1,196 with 22 illustrations. D. Appleton-Century Co. Inc., New York, 1935.

³³*Preventive Medicine and Hygiene.* By Milton J. Rosenau, Professor of Preventive Medicine and Hygiene, Harvard Medical School, etc. Sixth edition, pages 1,479. D. Appleton-Century Company, New York, 1935.

hygiene, heredity and eugenics, and infant mortality have been rewritten. Even this brief outline of the scope of this new edition of Rosenau's work can leave no doubt that it will prove also of considerable value and interest to the obstetrician.

—Hugo Ehrenfest

It is the purpose of the Public Health Service in issuing this publication, *Venereal Disease Information*,³⁴ to provide in condensed form a monthly summary of the scientific developments in the diagnosis, treatment, and control of syphilis and gonorrhea. More than three hundred American and foreign journals are reviewed for this work. Abstracts are made of articles describing laboratory, pathologic, and clinical work in the field of venereal diseases.

The most important literature on every phase of the subject is presented in the form of brief abstracts that are easily read. An index for the year is published with the December issue.

The journal is a contribution of the Public Health Service in its program with state and local health departments directed against the venereal diseases.

This book, *Growing Superior Children*,³⁵ will prove of aid to the general practitioner as well as a good guide to the intelligent mother. Its pages are replete with instructive information. The author devotes much space to the feeding and proper clothing problems of early infancy. These are treated with great clarity and detail. The growing child, with his habit-forming and mental and emotional adjustment periods, is philosophically discussed. He is presented as an individual unlike every other child, and an entity of character, psychology, and reactions specific to himself. A wealth of helpfulness may be gleaned from these facts by those who guide the destinies of a new generation. The space devoted to adolescence is short but concise, and though no new truths are uncovered it is valuable information. Above all, the book is written in a clear, interesting, and easy style that holds the attention of the reader from beginning to end. It should be a useful addition to a library for reference.

—Fred L. Adair and S. A. Pearl

A volume on the *Principles of Ethics*³⁶ by Dr. Moore answers the actual problems of a moral nature which may occur in the life of the undergraduate and graduate nurse. The book began in an attempt to answer such questions raised by a group of one hundred nurses who kept diaries over a period of time in which they recorded their daily moral problems and difficulties. In order to provide a solution for the problems of moral life encountered by these girls in their actual nursing experiences, it was found necessary to cover most of the field of applied ethics. The addition of a few other chapters has made a thorough text of ethics. Of particular interest of a practical nature is his very frank discussion of the nurse's responsibility to the physician and to the patient. The chapter on Contracts and Indemnity very definitely explains the responsibilities, moral and legal, involved in caring for the sick. The author attempts to solve, in a very frank manner, the problems of sexual life.

³⁴*Venereal Disease Information* is a monthly publication prepared by the U. S. Public Health Service for distribution among the medical profession throughout the United States. It measures approximately 6 by 9 inches and ranges in size from 25 to 75 pages.

³⁵*Growing Superior Children*. By I. Newton Kugelmass, Attending Pediatrician of the Broad Street Hospital, New York, etc. Illustrated, 568 pages. D. Appleton-Century Co., New York, 1935.

³⁶*Principles of Ethics*. By Dom Thomas Verner Moore, Ph.D., M.D., Monk of the Order of St. Benedict, Professor of Psychology, Catholic University of America, Washington, D. C. 381 pages. J. B. Lippincott Company, Philadelphia, 1935.

To the obstetrician and gynecologist who may well read the book with profit, is given the standpoint of the Roman Catholic Church on the morality of certain operations. This is an admirable discussion of the question of criminal abortion, the removal of the pregnant uterus when malignancy is present, the question of surgical interference and ectopic gestation, and the subject of destruction and mutilation of the unborn fetus. The author states that there has been a new orientation of the problem of tubal pregnancy, and the removal of the ectopic pregnancy is now permitted, even though it may be found in the course of an operation where the abdomen has been opened for some other cause. The discussion of contraception follows the principles set down in the recent encyclical of Pope Pius XI on Christian marriage. It is suggested that when the question of contraception arises, the relative sterile period of Ogino-Knauss may be suggested. Regarding sterilization the author brings out arguments exactly opposite to those advanced by the German Reich in the recent promulgation of mass sterilization of undesirables.

The study of this book clearly explains to nurse or physician, Protestant or Catholic, Jew or Gentile, the difference between right and wrong in any act connected with the professional life.

—Philip F. Williams

In this volume on the *Theory and Practice of Anaesthesia*,³⁷ Nosworthy covers in minute detail the technical and clinical features of anesthesia. While it is true that one cannot become an anesthetist by reading a book, nevertheless, a study of this book as one gives anesthesia will serve to make clear the difficulties which may be encountered, and to correct faulty technic as well as to receive suggestions for the elimination and treatment for complications. All types of inhalation anesthesia, the agents, methods and associated medications are described. Nosworthy has used ether as the prime example of inhalation anesthesia, and under this subject has discussed at great length all features of inhalation anesthesia, in order to permit more concise treatment in the following chapters on other inhalation agents. He has an excellent chapter on spinal anesthesia but does not discuss any other branch of regional anesthesia. Basal hypnotics and other methods of premedication are considered in conjunction with nitrogen oxide oxygen anesthesia. The chapter on choice of anesthetic should be of particular interest to the operator, since his is the final word regarding the agent to be used. Nosworthy suggests there be a preoperative consultation between the surgeon and the anesthetist. He regards chloroform as almost fool-proof in obstetrics but mentions its disadvantages in the intoxications of pregnancy. Nosworthy states, however, that nitrous oxide oxygen is without doubt the best anesthetic for obstetrics, as it has a quick induction and does not inhibit uterine contractions. He discusses the use of carbon dioxide in asphyxia and warns against the use of excessive rebreathing which might possibly lead to premature inspiration by the fetus.

This book is thorough and complete and should be of considerable help to those who are taking up this branch of medicine.

—Philip F. Williams

The author, Dr. Hayner, felt during his twelve years of teaching a necessity for a different type of book on *Regional Anatomy*.³⁸ He has prepared a text on regional anatomy in strictly descriptive form and without any illustrations. The book does not give any directions for dissection, nor does it purport to be a surgical anatomy in

³⁷*Theory and Practice of Anaesthesia*. By M. D. Nosworthy, M.D., Anaesthetist to Westminster Hospital, Grosvenor Hospital for Women, etc. With 35 illustrations, 224 pages. Hutchinson's Scientific Publications. London, E. C. 4., 1935.

³⁸*Regional Anatomy, Adapted to Dissection*. By J. C. Hayner, Associate Professor of Anatomy, Metropolitan Hospital, New York, etc. 687 pages. William Wood & Company, Baltimore, 1935.

an application of anatomical relationship and pathologic processes. The Basle Nomenclature has been used, as well as the original Latin names of the anatomical structures, with accompanying anglicized forms, a method which should accustom the student with the most common use of terminology.

While this type of Regional Anatomy in a purely descriptive manner is undoubtedly very satisfactory in many respects, it is a little disconcerting to find the subject of the fetal circulation discussed as to the abdomen in the early part of the book, and later on, many pages distant, in the thorax. The author regards the perineum anatomically rather than obstetrically, as do most anatomists, and his descriptions of the pelvic organs, muscles, and fascia in the female leave little to be desired.

Representing as it does a new style of anatomy, not a descriptive manuscript of surgical anatomy or an ordinary textbook, it will very likely be found of value to those needing this type of book.

—Philip F. Williams

The chief purpose of these studies, *The Human Foot*,³⁹ by Morton, has been to identify and analyze the primary factors of functional disorders of the foot.

The book is divided into three parts. The first deals with the evolutionary changes and other factors such as alteration in body size and gradual development of the brain, which slowly modified the foot from its earliest form. The changes in the foot under slowly changing conditions in the primates and anthropoids up to man, where the vertical position of the body is customary, reflect the physiologic adaptations of this member. Morton remarks, "The attainment of the upright posture through brachiation and the transfer of the leverage axis to the inner border of the foot were among the final and most important arboreal contributions which mankind has received from his ancestry; common with lower groups."

The physiology of the foot, the second part of the book, discusses the function of the foot in relation not only to weight bearing but to locomotion, both in walking and running. It is pointed out that the modifications of the foot, position and elevation of the arch have resulted from direct biologic response to the stresses placed upon it. The conception of an anterior transverse metatarsal arch is refuted. It is shown that a mild out-toeing, from a physiologic aspect, may be regarded as the position of greatest efficiency.

In considering the various functional disorders of the foot, the final section of the book, it is felt that they should be considered more in terms of work done by the different parts of the foot than solely by a consideration of form and posture. Disorders of the longitudinal arch and the metatarsal region are most thoroughly analyzed as to etiology, method of study, the associated factors and treatment.

Of interest, especially to the obstetrician, is the reference to the influence of sex as a factor in functional foot ailments. The use of abusive footwear by women is held responsible for the wide ratio between men and women in such disorders. To which may be added the presence of pregnancies, and the possibility of a physiologic laxation of the joints of the foot similar to that of the pelvic joints seen in pregnancy. The concluding chapter of the book on the general problem of foot welfare reveals not only the wide prevalence of foot disorders but the lack of proper attention often paid to them.

While the book may be regarded as primarily intended for orthopedists, it will be of interest and value to many in other branches of the profession as a record of human evolution and comparative morphology.

—Philip F. Williams

³⁹**The Human Foot. Its Evolutionary Development, Physiology and Functional Disorders.** By Dudley J. Morton, Associate Professor of Anatomy, College of Physicians and Surgeons, Columbia University. 244 pages. Columbia University Press, New York, 1935.

The mere fact that this work, *Aids to Surgery*,⁴⁰ by Joll and Ledlie, appears in its sixth edition is certain evidence of its usefulness. The first edition appeared in 1904. The authors state they have enlarged the book, and have added quite a number of illustrations in order to make it not only of use to the students, as originally intended, but to the practitioners as well. To carry out this aim they have gone into more detail in this edition, in treatment of minor surgical conditions commonly met with by the general practitioner. The book covers the whole field of surgery in a brief, concise text and an enormous amount of material appears to be compressed, by small print and thin paper, into 569 pages. Its size will enable it to be easily carried in a pocket or surgical bag.

—Philip F. Williams

This medical anthology, *For and Against Doctors*,⁴¹ is a piquant mixture of censure and praise gathered through all times, from the disparaging fables of Æsop to the modernistic quips of George Bernard Shaw. The correspondence and interest shown after the use of some of the material in the McAlister lecture, 1934, prompted the authors to amplify their collection to the present form.

There is bitter contempt, derisive scorn, and ironic jealousy, there is merited praise, personal appreciation and sympathetic understanding of the profession ranging from the musty Chinese proverb, "Medicine is one of the nine low trades," to Stephen Paget's, "If a doctor's life may not be a divine vocation, then no life is a vocation and nothing is divine." And between these, Plutarch, Seneca, Virgil, Pliny, Petrarch, Roger Bacon, Moliere, Shakespeare, Chaucer, René Descartes, and Chesterton show the gratitude or disregard in which the medical profession has been placed in song and story, verse and prose during the ages.

—Philip F. Williams

Dr. Braude in his short book, *Life Begins*,⁴² has added a brief résumé to much that has been written on the subject of childbirth in ancient times and the multitude of curious customs and traditions that became attached to a physiologic process unapprehended by the ancients. Such material affords interesting reading and amusing entertainment for those who seek a historical background to our civilization, and are fascinated by the primitive and weird practices.

The cause of the actual onset of labor, the author explains, though answered in many ways even today, was attributed by primitive peoples to the entry of the "shadow soul" of the child into the sexual organs of a woman just before lying-in. Being uncomfortable "in the womb where it is hot and suffocating, and which it stirs to activity in order to release it." The Babylonians explained the same phenomenon by a "myth in which the pangs of labor were attributed to the sin of some pre-existing heroine."

Such are the numerous, intriguing and quaint incidents pertaining to childbirth and the newborn as found in many books, but gathered into a compact concise form in a facile manner by the author.

—S. A. Pearl

⁴⁰*Aids to Surgery*. By Cecil A. Joll, Senior Surgeon to the Royal Free Hospital, etc., and Reginald C. B. Ledlie, Surgeon to Miller General Hospital, etc. Illustrated by H. H. Greenwood, Consulting Surgeon, G. W. R. Hospital, Swindon. Sixth edition. William Wood & Company, Baltimore, 1935.

⁴¹*For and Against Doctors*. An Anthology, Compiled by Robert Hutchison and G. M. Wauchope. 168 pages. William Wood & Company, Baltimore, 1935.

⁴²*Life Begins. Childbirth in Lore and in Literature*. By Morris Braude, Associate Professor of Psychiatry, Rush Medical College, University of Chicago. 163 pages. Argus Books, Chicago.

The author gives advice to the expectant mother in the care of herself and her new baby in a sound and facile manner. The brevity of the book, *Your New Baby*,⁴³ on a subject of vast importance and detail, indicates the careful sifting process the material has been subjected to, and only the main points presented clearly. This book should prove especially valuable to women in outlying rural districts, and to those away from large centers, when they are unable to obtain adequate prenatal care, and where preparations for a home delivery are pending. Much practical help may be obtained from its pages in the preparation for and in the rearing of the very young infant.

The simple kindly way in which much of the subject is presented is a boon to expectant mothers and adds a lesson in getting them to abandon fear and prepare for motherhood in a joyful, relaxing manner. In describing the Birth, Miss Wood tells: "As far as your baby's actual arrival is concerned, it is, and should be, a more or less hazy experience which you seldom remember. . . . All that you have to concern yourself with is cooperating with the doctor and nurses who are trying to help you. . . . Do not be afraid. . . ." These lines in themselves indicate the fear and apprehension with which too many a mother approaches her labor. Any work that can annihilate such unhealthy emotions is a contribution to the literature on the subject.

The chapters on the care of the baby are studded with many practical answers to questions the young mother either seeks over the telephone wires from her doctor or friends or which too often to her remain a mystery unopened and unsolved.

—S. A. Pearl

The chief merit of this little book, *Mother and Baby Care in Pictures*,⁴⁴ is its simple text and abundant illustrations. It gives concise and exact information concerning prenatal hygiene, preparation for and conduct of home confinement, and in somewhat greater detail, instruction as to care of the infant during the first year of life. There are chapters on the prenatal period, mother's clothes, baby's clothes, nursery needs, preparations for confinement, delivery, the baby's bath, weighing and dressing the baby, the baby's general care, feeding, habits, the baby's development, preventive care, toddler's clothes, common pre- and postpartum complaints, and female pelvic anatomy.

The pictures are for the most part well-selected and instructive. The text is conservative, clear, and explicit, adapted to the needs of women whose circumstances require them to take care of the baby themselves. A commendable feature of the book is its thoroughgoing attempt to answer a majority of the questions arising in the minds of prospective and nursing mothers, and to accomplish this purpose in a systematic, rather entertaining manner. It may be recommended with confidence that it will be useful, particularly to young primigravidas.

—Fred L. Adair

⁴³*Your New Baby. How to Prepare for It, How to Care for It.* By Linda McClure Woods, R.N. Illustrated. Robert M. McBride & Co., New York, 1935.

⁴⁴*Mother and Baby Care in Pictures.* By Louise Zabriskie, R.N., Formerly Night Supervisor Lying-in Hospital, New York City; Field Director Maternity Center Association, New York City. With 187 illustrations; 196 pages. J. B. Lippincott Company, Philadelphia, 1935.

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